H1409

0057393

Date: 10 December 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-TW-1&2 - Soil Sampling
Subject: Inorganics - Data Package No. H1409-LLI (SDG No. H1409)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	See note 1
B125Y4	6/27/01	Soil	C	See note 1

1- ICP metals by 6010B; mercury by 7470A.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times for ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements is six (6) months for ICP metals and 28 days for mercury.

  All holding times were acceptable.

- **Blanks**

Preparation (Method) Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the target required quantitation limit (TRQL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the TRQL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125% (70-130% for TOC). Samples with a spike recovery of less than 25% and a sample result below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% (69% for TOC) and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% (130-70% for TOC) and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% (130% for TOC) and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 353.9%, the calcium result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 74.3%, the mercury result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 129.1%, the bismuth result in sample B125X2 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 35% for soil samples. If RPD values are out of specification and the sample concentration is greater than five times the TRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the TRQL and the sample concentration is less than five times the TRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for laboratory duplicates are an RPD less than 35% for positive sample results greater than five times the TRQL or plus or minus 2 times the TRQL for positive sample results less than five times the TRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to an RPD of 64%, the nickel result in sample B125Y4 was qualified as an estimate and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 target required quantitation limits (TRQL) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TRQL.

- **Completeness**

Data package No. H1409-LLI (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 353.9%, the calcium result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 74.3%, the mercury result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 129.1%, the bismuth result in sample B125X2 was qualified as an estimate and flagged "J". Due to an RPD of 64%, the nickel result in sample B125Y4 was qualified as an estimate and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nickel	J	B125Y4	RPD
Calcium Mercury Bismuth	J	B125X2	Matrix spike recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																	
Laboratory: Lionville Laboratory Inc.																	
Case:	SDG: H1409																
Sample Number		B125X2		B125Y4													
Remarks																	
Sample Date		06/27/01		06/27/01													
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	2	0.30	U	*0.29*	*U*												
Aluminum		9540		5900													
Bismuth		198	J	8.2													
Calcium		8130	J	7980													
Cadmium		0.46	U	0.44	U												
Chromium	1	27.3		8.9													
Copper	2.5	11.9		12.9													
Iron		19200		20200													
Mercury	0.2	0.18	J	0.02	U												
Potassium		1720		771													
Magnesium		5460		4080													
Manganese		318		272													
Molybdenum		10.6	U	10.3	U												
Sodium		1510		832													
Nickel	4	38.0		8.7	J												
Lead	10	11.8		5.0													
Vanadium		39.8		52.3													
Zinc		39.9		38.4	U												

Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L228

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B125Y4	Silver, Total	0.29 u	MG/KG	0.29	1.0
		Aluminum, Total	5900	MG/KG	1.7	1.0
		Bismuth, Total	5.2	MG/KG	5.7	1.0
		Calcium, Total	7960	MG/KG	2.7	1.0
		Cadmium, Total	0.44 u	MG/KG	0.44	1.0
		Chromium, Total	8.9	MG/KG	0.40	1.0
		Copper, Total	12.9	MG/KG	0.25	1.0
		Iron, Total	20200	MG/KG	1.1	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	771	MG/KG	44.6	1.0
		Magnesium, Total	4080	MG/KG	2.7	1.0
		Manganese, Total	272	MG/KG	0.19	1.0
		Molybdenum, Total	10.3 u	MG/KG	10.3	1.0
		Sodium, Total	932	MG/KG	2.0	1.0
		Nickel, Total	8.7 J	MG/KG	1.2	1.0
		Lead, Total	5.0	MG/KG	3.2	1.0
		Vanadium, Total	52.3	MG/KG	0.44	1.0
		Zinc, Total	38.4	MG/KG	0.30	1.0

12/4/01

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/26/01

CLIENT: TNUHANFORD S01-058 H1409 LVL LOT #: 0107L231
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B125X2	Silver, Total	0.30 u	MG/KG	0.30	1.0
		Aluminum, Total	9540	MG/KG	1.6	1.0
		Bismuth, Total	198 J	MG/KG	5.9	1.0
		Calcium, Total	8130 J	MG/KG	2.8	1.0
		Cadmium, Total	0.46 u	MG/KG	0.46	1.0
		Chromium, Total	27.2	MG/KG	0.41	1.0
		Copper, Total	11.9	MG/KG	0.35	1.0
		Iron, Total	19200	MG/KG	1.1	1.0
		Mercury, Total	0.18 J	MG/KG	0.02	1.0
		Potassium, Total	1720	MG/KG	46.0	1.0
		Magnesium, Total	5460	MG/KG	2.7	1.0
		Manganese, Total	218	MG/KG	0.19	1.0
		Molybdenum, Total	10.6 u	MG/KG	10.6	1.0
		Sodium, Total	1810	MG/KG	2.1	1.0
		Nickel, Total	38.0	MG/KG	1.2	1.0
		Lead, Total	11.6	MG/KG	3.3	1.0
		Vanadium, Total	39.8	MG/KG	0.46	1.0
		Zinc, Total	39.9	MG/KG	0.31	1.0

12/4/01

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LVLI
HONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-058
LVL#: 0107L228, 231
SDG/SAF#: H1409/B01-058

W.O.#: 11343-606-001-9999-00
Date Received: 07-05-01

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperatures have been recorded on the Chain of Custodies.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits.

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. The matrix spike (MS) recoveries for 7 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration levels for the following analytes:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
B125Y4	Aluminum	20,000	106.1
	Iron	20,000	89.0
B125X2	Aluminum	20,000	91.5
	Bismuth	5,000	87.1
	Calcium	20,000	93.7
	Iron	20,000	61.0

12. The duplicate analyses for 10 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

07-31-01
Date

gmb/m07-228. 231

Bechtel Hanford Inc. — **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

Collector Thomas G./Watson D./[illegible] A.	**Company Contact** Todd, M.E.	**Telephone No.** (509) 372-9631	**Project Coordinator** TRENT, SJ
Project Designation 200-TW-1 & 2 - Soil Sampling	**Sampling Location** T-26/200 W		**SAF No.** B01-058
Ice Chest No. SM1 153 RT 6-30-01 268	**Field Logbook No.** EL-1518	**COA** B20TW1A44C	**Method of Shipment** Government Vehicle/Fed EX
Shipped To RT 6-28-01 Severn Trent Incorporated RCRA	**Offsite Property No.** RSR 104130		**Bill of Lading/Air Bill No.** N/A

Price Code 8N — **Data Turnaround** 45 Days — **Air Quality** ☐

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive 55k dpm activity on bottles <0.5 mrem dose

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None		
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)	1	1	1	DELETE	1	1	1			
Volume	120mL	60mL	250mL	60mL 6-28-01	250mL	120mL	250mL	60mL 6-28-01		

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See Item (1) in Special Instructions.	Chromium Hex - 7196	See Item (2) in Special Instructions.	VOA - 8260A (TCL)	See Item (3) in Special Instructions.	See Item (4) in Special Instructions.	See Item (5) in Special Instructions.	Activity Scan		
B125X2	SOIL	06-27-01	1115	X	X	X		X	X			TIE TO B12G38	

Samples stored in Ref. # IC at the 3728 Shipping Facility on 6/28/01. Collector not available to relinquish samples on 7/2/01 for shipment. RT 7.2.01

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
K. Fehl KFehl	6-28-01 0800	R F I C	6-28-01 0800
R F I C 3728	7/2/01 0800	R F R Thoren	7-2-01 0800
R F R Thoren	7-2-01 0800	F E D E X	
F E D E X	7/5/01 1015	C. Skeen	7/5/01 1015

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP Metals - 6010A (Add-on) (Bismuth, Lead); Mercury - 7470 - (CV)
(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); Ammonia - 350.1; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) Semi-VOA -- 8270A (Add-On) (Tributyl phosphate); TPH-Diesel Range - WTPH-D
(4) ICP Metals - 6010TR (Client List) (Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc)
(5) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Gamma Spec., Add-on (Radium-226, KRMS-224); Isotopic Plutonium, Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-59; Strontium-89,90; Total-Sr, Technetium-99; Total Uranium, Uranium-235; Isotopic Uranium~~

RT 6-28-01

Matrix *
A=Air
DI=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
O=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

0000018

Bechtel Hanford Inc. | **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** | B01-058-14

Collector: Thomas G./Watson D.	Company Contact: Todd, M.E.	Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ
Price Code: 8N	Data Turnaround: 45 Days	Air Quality ☐	
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: T-26/200 W	SAF No.: B01-058	
Ice Chest No.: ERC99-065 / SML442	Field Logbook No.: EL-1518	COA: B20TW1A44C	Method of Shipment: Fed EX
Shipped To: TMA/HECRA	Offsite Property No.: A010428	Bill of Lading/Air Bill No.: 423579454-5524 / 553	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive COUNTS: BACKGROUND ON SPLIT SPOON < 0.5 mrem DOSE

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1
Volume	500mL	1000mL	1000mL	500mL	500mL	1000mL

Samples stored in Ref.# 18
Shipping Facility on 6/27
Collector not available to rel
samples on 7/2/01 for si

SAMPLE ANALYSIS

Sample No.	Matrix*	Sample Date	Sample Time	See Item (1) in Special Instructions	See Item (2) in Special Instructions	VOA 8260A (TCL)	See Item (3) in Special Instructions	See Item (4) in Special Instructions	See Item (5) in Special Instructions				
B125Y4	SOIL	06-27-01	0430	X	X		X	X				TIETO	B12
													B1

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DOWSON/TRENT	06-27-01 0820	REF. 18 3728	06-27-01 0820
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R of 18 3728	7.2.01 0800	R Thorer	7.2.01 0800
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R Thorer	7.2.01 0800	FEDEX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FEDEX	7/5/01 10:15	R Thorer	7/5/01 1015
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Bismuth, Lead}; Mercury - 7470 - (CV); Chromium Hex - 7196
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) Semi-VOA - 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D
(4) ICP Metals - 6010TR (Client List) {Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}
(5) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Radium-226, Radium-228}; Isotopic Uranium; Isotopic Thorium; Plutonium-238; Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-90; Technetium-99; Total Uranium; Tritium; Uranium-233/234; Isotopic Uranium

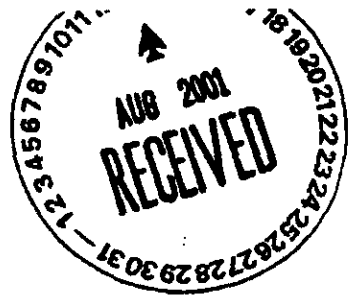
ET 6-25-01

Matrix

S=Soil
SD=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)



Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125Y4						
SILVER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
BISMUTH, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL REP	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL SPIKE	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
CALCIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MERCURY, TOTAL	001	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 REP	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 MS	S	01C0228	06/27/01	07/23/01	07/23/01
POTASSIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MANGANESE, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MOLYBDENUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
SODIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01

LAB QC:

SILVER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SILVER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM LABORTORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
BISMUTH, LCS	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
BISMUTH, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
CALCIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CALCIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
COPPER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
COPPER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
IRON LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
IRON, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY LABORATORY	LC1 BS	S	01C0228	N/A	07/23/01	07/23/01
MERCURY, TOTAL	MB1	S	01C0228	N/A	07/23/01	07/23/01
POTASSIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
POTASSIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MOLYBDENUM LABORATOR	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
MOLYBDENUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
SODIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SODIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
NICKEL LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
NICKEL, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
LEAD LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
LEAD, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ZINC LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ZINC, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

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Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2						
SILVER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
BISMUTH, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL REP	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL SPIKE	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
CALCIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MERCURY, TOTAL	001	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 REP	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 MS	S	01C0228	06/27/01	07/23/01	07/23/01
POTASSIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MANGANESE, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MOLYBDENUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
SODIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01

LAB QC:

SILVER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SILVER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM LABORTORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
BISMUTH, LCS	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
BISMUTH, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
CALCIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CALCIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
COPPER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
COPPER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
IRON LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
IRON, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

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Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY LABORATORY	LC1 BS	S	01C0228	N/A	07/23/01	07/23/01
MERCURY, TOTAL	MB1	S	01C0228	N/A	07/23/01	07/23/01
POTASSIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
POTASSIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MOLYBDENUM LABORATOR	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
MOLYBDENUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
SODIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SODIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
NICKEL LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
NICKEL, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
LEAD LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
LEAD, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ZINC LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ZINC, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-TW-1&2			DATA PACKAGE: H1409		
VALIDATOR: TCI		LAB: LLT		DATE: 2Dec01	
CASE:			SDG: H1409		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☒ SW-846/Hg	☐ SW-846 Cyanide	☐	☐
SAMPLES/MATRIX	B125X2	~~B125X4~~	B125X4	Soil	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments? . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A
Are ICP interference checks acceptable? . . . . . Yes No N/A
Were ICV and CCV checks performed on all instruments? . . . . . Yes No N/A
Are ICV and CCV checks acceptable? . . . . . Yes No N/A
Comments:

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No N/A
Are ICB and CCB results acceptable? . . . . . Yes No N/A
Were preparation blanks analyzed? . . . . . Yes No N/A
Are preparation blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments:

5. ACCURACY

Were spike samples analyzed? . . . . . Yes No N/A yes
Are spike sample recoveries acceptable? . . . . . Yes No N/A no
Were laboratory control samples (LCS) analyzed? . . . . . Yes No N/A yes
Are LCS recoveries acceptable? . . . . . Yes No N/A yes
Comments: Y4 – al (411.2) Fe (194) ok
X2 al (394.7) calcium (393.4) iron (249.3) Hg (194.3)
Bismuth (129.1)

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed?	(Yes)	No	N/A
Are laboratory duplicate samples RPD values acceptable?	Yes	(No)	N/A
Were ICP serial dilution samples analyzed?	Yes	No	(N/A)
Are ICP serial dilution %D values acceptable?	Yes	No	(N/A)
Are field duplicate RPD values acceptable?	Yes	No	(N/A)
Are field split RPD values acceptable?	Yes	No	(N/A)

Comments: Pb Ni (6470) ~~Pb (1557)~~ ~~Pb (1557)~~

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required?	Yes	No	(N/A)
Are duplicate injection %RSD values acceptable?	Yes	No	(N/A)
Were analytical spikes performed as required?	Yes	No	(N/A)
Are analytical spike recoveries acceptable?	Yes	No	(N/A)
Was MSA performed as required?	Yes	No	(N/A)
Are MSA results acceptable?	Yes	No	(N/A)

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses?	(Yes)	No	N/A
Are all results supported in the raw data?	Yes	No	(N/A)
Are results calculated properly?	Yes	No	(N/A)
Do results meet the CRDLs?	(Yes)	No	N/A

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Lababoratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L228
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	01L0426-MB1	Silver, Total	0.28	u	MG/KG	0.28	1.0
		Aluminum, Total	1.7	u	MG/KG	1.7	1.0
		Bismuth, Total	5.6	u	MG/KG	5.6	1.0
		Calcium, Total	2.6	u	MG/KG	2.6	1.0
		Cadmium, Total	0.43	u	MG/KG	0.43	1.0
		Chromium, Total	0.39	u	MG/KG	0.39	1.0
		Copper, Total	0.24	u	MG/KG	0.24	1.0
		Iron, Total	1.1	u	MG/KG	1.1	1.0
		Potassium, Total	43.4	u	MG/KG	43.4	1.0
		Magnesium, Total	2.6	u	MG/KG	2.6	1.0
		Manganese, Total	0.18	u	MG/KG	0.18	1.0
		Molybdenum, Total	10.0	u	MG/KG	10.0	1.0
		Sodium, Total	3.3		MG/KG	1.9	1.0
		Nickel, Total	1.1	u	MG/KG	1.1	1.0
		Lead, Total	3.1	u	MG/KG	3.1	1.0
		Vanadium, Total	0.43	u	MG/KG	0.43	1.0
		Zinc, Total	0.89		MG/KG	0.29	1.0
BLANK1	01C0228-MB1	Mercury, Total	0.02	u	MG/KG	0.02	1.0

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Lionville Lababoratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	01L0426-MB1	Silver, Total	0.28 u	MG/KG	0.28	1.0
		Aluminum, Total	1.7 u	MG/KG	1.7	1.0
		Bismuth, Total	5.6 u	MG/KG	5.6	1.0
		Calcium, Total	2.6 u	MG/KG	2.6	1.0
		Cadmium, Total	0.43 u	MG/KG	0.43	1.0
		Chromium, Total	0.39 u	MG/KG	0.39	1.0
		Copper, Total	0.24 u	MG/KG	0.24	1.0
		Iron, Total	1.1 u	MG/KG	1.1	1.0
		Potassium, Total	43.4 u	MG/KG	43.4	1.0
		Magnesium, Total	2.6 u	MG/KG	2.6	1.0
		Manganese, Total	0.18 u	MG/KG	0.18	1.0
		Molybdenum, Total	10.0 u	MG/KG	10.0	1.0
		Sodium, Total	3.3	MG/KG	1.9	1.0
		Nickel, Total	1.1 u	MG/KG	1.1	1.0
		Lead, Total	3.1 u	MG/KG	3.1	1.0
		Vanadium, Total	0.43 u	MG/KG	0.43	1.0
		Zinc, Total	0.89	MG/KG	0.29	1.0
BLANK1	01C0228-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Lababoratory, Inc.

INORGANICS ACCURACY REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B12SX2	Silver, Total	4.9	0.30u	5.3	92.5	1.0
		Aluminum, Total	10700	9540	212	536.7*	1.0
		Bismuth, Total	882	198	530	129.1	1.0
		Calcium, Total	17500	8130	2650	353.9	1.0
		Cadmium, Total	4.7	0.46u	5.3	88.7	1.0
		Chromium, Total	48.3	27.3	21.2	99.1	1.0
		Copper, Total	36.5	11.9	26.5	92.8	1.0
		Iron, Total	21300	19200	106	2045 *	1.0
		Mercury, Total	0.31	0.18	0.17	74.3	1.0
		Potassium, Total	4460	1720	2650	103.3	1.0
		Magnesium, Total	8360	5460	2650	109.2	1.0
		Manganese, Total	384	318	53.0	124.7*	1.0
		Molybdenum, Total	97.5	10.6 u	106	92.0	1.0
		Sodium, Total	4320	1510	2650	106.1	1.0
		Nickel, Total	98.7	38.0	53.0	114.5	1.0
		Lead, Total	55.6	11.6	53.0	83.0	1.0
		Vanadium, Total	98.6	39.8	53.0	110.9	1.0
		Zinc, Total	93.8	29.9	53.0	101.7	1.0

Lionville Lababoratory, Inc.

INORGANICS ACCURACY REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L228

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B125Y4	Silver, Total	4.9	0.29u	5.1	96.1	1.0
		Aluminum, Total	6750	5900	206	411.5*	1.0
		Bismuth, Total	489	8.2	514	93.6	1.0
		Calcium, Total	10100	7980	2570	82.3	1.0
		Cadmium, Total	4.9	0.44u	5.1	96.1	1.0
		Chromium, Total	30.2	8.9	20.6	103.4	1.0
		Copper, Total	36.7	12.9	25.7	92.6	1.0
		Iron, Total	22200	20200	103	1956 *	1.0
		Mercury, Total	0.16	0.02u	0.16	100	1.0
		Potassium, Total	3150	771	2570	92.6	1.0
		Magnesium, Total	6660	4080	2570	100.6	1.0
		Manganese, Total	325	272	51.4	102.7*	1.0
		Molybdenum, Total	95.7	10.3 u	103	93.1	1.0
		Sodium, Total	3290	832	2570	95.8	1.0
		Nickel, Total	62.1	8.7	51.4	103.9	1.0
		Lead, Total	52.9	5.0	51.4	93.2	1.0
		Vanadium, Total	105	52.3	51.4	102.3	1.0
		Zinc, Total	89.2	38.4	51.4	98.8	1.0

Lionville Lababoratory, Inc.

INORGANICS PRECISION REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B125X2	Silver, Total	0.30u	0.30u	NC	1.0
		Aluminum, Total	9540	9860	3.3	1.0
		Bismuth, Total	198	260	27.1	1.0
		Calcium, Total	8130	9530	15.8	1.0
		Cadmium, Total	0.46u	0.46u	NC	1.0
		Chromium, Total	27.3	26.9	1.5	1.0
		Copper, Total	11.9	11.6	2.6	1.0
		Iron, Total	19200	21200	10.2	1.0
		Mercury, Total	0.18	0.18	0.54	1.0
		Potassium, Total	1720	1660	3.7	1.0
		Magnesium, Total	5460	5540	1.3	1.0
		Manganese, Total	318	358	11.8	1.0
		Molybdenum, Total	10.6 u	10.6 u	NC	1.0
		Sodium, Total	1510	1590	5.7	1.0
		Nickel, Total	38.0	38.9	2.3	1.0
		Lead, Total	11.6	10.6	9.0	1.0
		Vanadium, Total	39.8	46.9	16.4	1.0
		Zinc, Total	39.9	42.6	6.5	1.0

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Lionville Lababoratory, Inc.

INORGANICS PRECISION REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L228

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B125Y4	Silver, Total	0.29u	0.45	NC (200)	1.0
		Aluminum, Total	5900	6750	13.4	1.0
		Bismuth, Total	8.2	5.7 u	NC (200)	1.0
		Calcium, Total	7980	8380	4.9	1.0
		Cadmium, Total	0.44u	0.44u	NC	1.0
		Chromium, Total	8.9	11.9	28.8	1.0
		Copper, Total	12.9	15.2	16.4	1.0
		Iron, Total	20200	26300	26.4	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Potassium, Total	771	860	10.9	1.0
		Magnesium, Total	4080	4910	18.6	1.0
		Manganese, Total	272	368	30.1	1.0
		Molybdenum, Total	10.3 u	10.3 u	NC	1.0
		Sodium, Total	832	960	14.3	1.0
		Nickel, Total	8.7	17.0	64.6	1.0
		Lead, Total	5.0	7.9	45.0	1.0
		Vanadium, Total	52.3	68.7	27.1	1.0
		Zinc, Total	28.4	47.8	21.8	1.0

ujb 7/30/01

Date: 10 December 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-TW-1&2 - Soil Sampling
Subject: Diesel Range Organics - Data Package No. H1409-LLI (SDG No. H1409)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	Diesel Range Organics
B125Y4	6/27/01	Soil	C	Diesel Range Organics
B125X2RE*	6/27/01	Soil	C	Diesel Range Organics
B125Y4RE*	6/27/01	Soil	C	Diesel Range Organics

* - Both samples were re-extracted and re-analyzed.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times for diesel range organics is assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements is 14 days to extraction and 40 days for analysis.

  The re-extraction took place outside QC limits and the associated results

(B125X2RE and B125Y4RE) were qualified as estimates and flagged "J".

All other holding times were acceptable.

- **Blanks**

Preparation (Method) Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Target Required Quantitation Limit (TRQL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the TRQL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J".

Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to matrix spike recovery of 0%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If surrogate recoveries are out of control limits (50-100%) or outside laboratory control limits, all associated sample results greater than the target required quantitation limit (TRQL) are qualified as estimates and flagged "J". Sample results less than the TRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the TRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to a surrogate recovery of 0%, the diesel range organics result in sample B125Y4 was rejected and flagged "R".

Due to a surrogate recovery of 10%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". The MS recovery was also outside QC limits (undetected).

All other surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to low MSD recoveries (0% and 37%) and prior qualification, no RPD was calculated for sample B125X2.

All other MS/MSD results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 TRQL to ensure that laboratory detection levels meet the required criteria. All undetected diesel range organics results exceeded the TRQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H1409-LLI (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 75%.

MAJOR DEFICIENCIES

Due to a surrogate recovery of 0%, the diesel range organics result in sample B125Y4 was rejected and flagged "R". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

The re-extraction took place outside QC limits and the associated results (B125X2RE and B125Y4RE) were qualified as estimates and flagged "J". Due to a surrogate recovery of 10%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". Due to matrix spike recovery of 0%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected diesel range organics results exceeded the TRQL. Under the BHI

statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Diesel range organics	J	B125X2RE, B125Y4RE	Holding time
Diesel range organics	J	B125X2	Matrix spike recovery
Diesel range organics	J	B125X2	Surrogate recovery
Diesel range organics	R	B125Y4	Surrogate recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

DIESEL RANGE ORGANICS ANALYSIS, SOIL MATRIX, (MG/KG) Page__1__ of__1__

Project: BECHTEL-HANFORD															
Laboratory: Lionville Laboratory Inc.															
Case:	SDG: H1409														
Sample Number		B125X2		B125Y4		B125X2RE		B125Y4RE							
Remarks															
Sample Date		6/27/01		6/27/01		6/27/01		6/27/01							
Extraction Date		7/6/01		7/6/01		7/20/01		7/20/01							
Analysis Date		7/10/01		7/10/01		7/26/01		7/26/01							
Diesel Range Organics	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Diesel Range Organics	5	13	J	12.4	UR	12.8	UJ	12.7	UJ						

0000111

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

DIESEL RANGE ORGANICS BY GC

Report Date: 07/27/01 10:32

RFW Batch Number: 0107L231 Client: TNUHANFORD B01-058 H1409 Work Order: 11343606001 Page: 1

	Cust ID:	B125X2	B125X2	B125X2	B125X2	B125X2	B125X2
Sample Information	RFW#:	001	001	001 MS	001 MS	001 MSD	001 MSD
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg REPREP	mg/kg	mg/kg REPREP	mg/kg	mg/kg REPREP
p-Terphenyl		10 * %	78 %	0 * %	86 %	4 * %	88 %
Diesel Range Organics		13 J	12.8 U J	U * %	72 %	37 %	69 %

	Cust ID:	BLK	BLK BS	BLK	BLK BS
Sample Information	RFW#:	01LE0801-MB1	01LE0801-MB1	01LE0871-MB1	01LE0871-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg
p-Terphenyl		12 * %	0 * %	89 %	108 %
Diesel Range Organics		12.0 U	59 %	12.0 U	87 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

0000142

7/27/01

7/27/01

Lionville Laboratory, Inc.

DIESEL RANGE ORGANICS BY GC

Report Date: 07/27/01 10:42

RFW Batch Number: 0107L228 Client: TNUHANFORD B01-058 H1409 Work Order: 11343606001 Page: 1

	Cust ID:	B125Y4	B125Y4	B125Y4	B125Y4	B125Y4	B125Y4
Sample Information	RFW#:	001	001 REPREP	001 MS	001 MS REPREP	001 MSD	001 MSD REPREP
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
p-Terphenyl		0 * %	89 %	1 * %	87 %	11 * %	99 %
Diesel Range Organics		12.4 U R	12.7 U J	72 %	66 %	87 %	76 %

	Cust ID:	BLK	BLK BS	BLK	BLK BS
Sample Information	RFW#:	01LE0801-MB1	01LE0801-MB1	01LE0871-MB1	01LE0871-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg
p-Terphenyl		12 * %	0 * %	89 %	108 %
Diesel Range Organics		12.0 U	59 %	12.0 U	87 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

000013

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client : TNU HANFORD B01-058
LVL# : 0107L231
SDG/SAF#: H1405/B01-058

W.O #: 11343-606-001-9999-00
Date Received: 07-05-01

DIESEL RANGE ORGANICS

One (1) soil sample was collected on 06-27-01.

The sample and its associated QC samples were prepared on 07-06-01, re-extracted on 07-20-01, and analyzed according to Lionville Laboratory OPs based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 07-10,25, 26-01. The analysis met the intent of method WTPH-D.

1. The cooler temperature has been recorded on the chain-of-custody.

2. All required holding times for analysis were met. Due to low surrogate recoveries, the sample was re-extracted outside of hold time. Both the original and the re-extracted results have been reported. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

3. All initial calibrations associated with this data set were within acceptance criteria.

4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.

5. Five (5) of ten (10) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

6. All blank spike recoveries were within acceptance criteria.

7. One (1) of four (4) matrix spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

7/31/01
Date

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208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

LVLI
LIONVILLE LABORATORY INC.

Analytical Report

Client : TNU HANFORD B01-058
LVL# : 0107L228
SDG/SAF#: H1409/B01-058

W.O #: 11343-606-001-9999-00
Date Received: 07-05-01

DIESEL RANGE ORGANICS

One (1) soil sample was collected on 06-27-01.

The sample and its associated QC samples were prepared on 07-06-01, re-extracted on 07-20-01, and analyzed according to Lionville Laboratory OPs based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 07-10,25,26-01. The analysis met the intent of method WTPH-D.

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for the analysis were met. Due to low surrogate recoveries, the sample was re-extracted outside of hold time. Both the original and the re-extracted results have been reported. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. Five (5) of ten (10) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

7/31/01
Date

R:\share\dro\07-228.doc

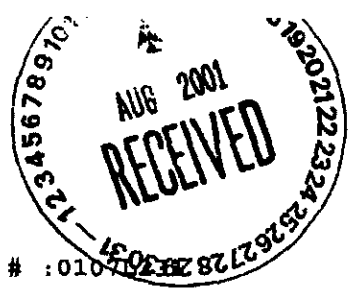
208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

Lionville Laboratory, Inc.
DRO ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

RFW LOT # :0107[illegible]28

CLIENT ID	RFW #	MTX	PREP #	COLLECTN DATE	REC EXT/PREP	ANALYSIS
B125Y4	001	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125Y4	001 R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
B125Y4	001 MS	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125Y4	001 MS R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
B125Y4	001 MSD	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125Y4	001 MSD R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
LAB QC:							
BLK	MB1	S	01LE0801	N/A	N/A	07/06/01	07/10/01
BLK	MB1 BS	S	01LE0801	N/A	N/A	07/06/01	07/10/01
BLK	MB1	S	01LE0871	N/A	N/A	07/20/01	07/25/01
BLK	MB1 BS	S	01LE0871	N/A	N/A	07/20/01	07/25/01

7/30/01



Lionville Laboratory, Inc.
DRO ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

RFW LOT # :010[illegible]

CLIENT ID	RFW #	MTX	PREP #	COLLECTN DATE	REC EXT/PREP	ANALYSIS
B125X2	001	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125X2	001 R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
B125X2	001 MS	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125X2	001 MS R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
B125X2	001 MSD	S	01LE0801	06/27/01	07/05/01	07/06/01	07/10/01
B125X2	001 MSD R1	S	01LE0871	06/27/01	07/05/01	07/20/01	07/26/01
LAB QC:						
BLK	MB1	S	01LE0801	N/A	N/A	07/06/01	07/10/01
BLK	MB1 BS	S	01LE0801	N/A	N/A	07/06/01	07/10/01
BLK	MB1	S	01LE0871	N/A	N/A	07/20/01	07/25/01
BLK	MB1 BS	S	01LE0871	N/A	N/A	07/20/01	07/25/01

Richland Laboratory Sample Discrepancy Report (SDR) SDR #: _____

Initiator: L. Kaufman Batch: 0107L228, 231 Parameter: ODRO
Date: 7-19-01 Samples: All Matrix: SOIL
Client: TWR Hanford Method: SW846/MCAWW/CLP/ Prep Batch: 01LE801

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C
__ Transcription Error __ Wrong Test Code __ Other _____

b. General Discrepancy

__ Missing Sample/Extract* __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample* __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. Problem (Include all relevant specific results; attach data if necessary)

Very low recoveries for surrogates in all samples and QC (0-12 %).

2. Known or Probable Causes(s)

3. Discussion and Proposed Action Other Description:

__ Re-log
__ Entire Batch
__ Following Samples: _____
__ Re-leach
☑ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to _____
__ Place On/Take Off Hold (circle)

4. Project Manager Instructions...signature/date: _____

☑ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: _____ Other Explanation:

☑ Verified re-[log][leach][extract][digest][analysis] (circle)
__ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

01LE0871

Samples extracted past holdtime cc 7/26/01

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
__	X Initiator	__	__ Metals: Beegle
__	X Lab General Manager: M. Taylor	__	__ Inorganic: Perrone
1	X Project Mgr: Stone/Johnson/Haslett	2	X GC/LC: Kiger
__	X Technical Mgr: Wesson/Daniels	__	__ MS: Rychlak/Layman
__	X QA (file): Alberts	__	__ Log-in: Keppel
__	__ Data Management: Feldman	__	__ Admin: Soos
__	__ Sample Prep: Beegle/Kiger	__	__ Other: _____

000019

L-WI-006/E-01/01

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-058-14
Collector: Thomas G./Watson D.	Company Contact: Todd, M.E. — Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ — Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: T-26/200 W	SAF No.: B01-058 — Air Quality ☐
Ice Chest No.: ERC99-065 / SML442	Field Logbook No.: EL-1518 — COA: B20TW1A44C	Method of Shipment: Fed EX
Shipped To: ~~TMA~~/RECRA	Offsite Property No.: A01 0428	Bill of Lading/Air Bill No.: 423574534-5524 / 5535

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive COUNTS: BACKGROUND on SPLIT SPOON & D. Smear DOSE

Special Handling and/or Storage

000020

Samples stored in Ref.# 1B at t
Shipping Facility on 6/27/10
Collector not available to relea
samples on 7/2/01 for ship

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1	1	1	1	1
Volume	500mL	1000mL	1000mL	500mL	500mL	1000mL

SAMPLE ANALYSIS

Sample No.	Matrix*	Sample Date	Sample Time	See item (1) in Special Instructions	See item (2) in Special Instructions	VOA - 8260A (TCL)	See item (3) in Special Instructions	See item (4) in Special Instructions	See item (5) in Special Instructions				
B125Y4	SOIL	06-27-01	0430	X	X	DOW OBTAIN 6-27-01	X	X	DOW OBTAIN			TCLP	B125Y4 B12L

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DOW SAMPLER TEAM	6-27-01 0820	REF. 1B 3728	6-27-01 0820
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Ref 1B 3728 7.2.01	0800	R Thorne	7.2.01 0800
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R Thorne 7.2.01	0800	FEDEX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FedEx	7/5/01 10:15	R Thorne	7/5/01 1015
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

Sign/Print Names

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP Metals - 6010A (Add-on) (Bismuth, Lead); Mercury - 7470 - (CV); Chromium Hex - 7196
(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfide); Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) Semi-VOA – 8270A (Add-On) (Tributyl phosphate); TPH-Diesel Range - WTPH-D
(4) ICP Metals - 6010TR (Client List) (Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc)
(5) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~; ~~Gamma Spec Add-on (Radium-226, Radium-228); Isotopic Plutonium, Isotopic Thorium (Plutonium-238, Americium-241, Curium-244, Neptunium-237, Nickel-63, Strontium-89/90, Total Uranium, Tritium, Uranium Isotopic, Uranium~~

AT 6-27-01

Matrix*
S=Soil
SD=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solid
DL=Drum Liq
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-058-2	Page 1 of 1
Collector: Thomas G./Watson D./[illegible] A.	Company Contact: Todd, M.E. — Telephone No.: (309) 372-9631	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days — Air Quality ☐
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: T-26/200 W	SAF No.: B01-058	
Ice Chest No.: SM1 153 FT 6-30-01 268	Field Logbook No.: EL-1518 — COA: B20TW1A44C	Method of Shipment: Government Vehicle/Fed EX	
Shipped To: FT 6-28-01 RCRA	Offsite Property No.: RSR 104130	Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive — 55k dpm activity on bottles <0.5 mrem dose

Special Handling and/or Storage

00000021

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None		
Type of Container	sG	sG	sG	sG	sG	sG	sG	sG		
No. of Container(s)	1	1	1	1	1	1	1	1		
Volume	120mL	60mL	250mL	60mL	250mL	120mL	250mL	60mL		

DELETE FT 6/28/01

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 8260A (TAL)	See item (3) in Special Instructions.	See item (4) in Special Instructions.	See item (5) in Special Instructions.	Activity Scan		
B125X2	SOIL	06-27-01	1115	X	X	X		X	X			TIE TO	B10609

Samples stored in Ref.# IC at the 3728 Shipping Facility on 6/28/01. Collector not available to relinquish samples on 7/2/01 for shipment. FT 7-2-01

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R. Fabb [illegible]	6-28-01 0800	R F I C	6-28-01 0800
R T Thoren	7/2/01 0800	R T Thoren	7-2-01 0800
R T Thoren	7-2-01 0800	F E DeH	
F E DeH	7/5/01 1015	V. Kennedy	7/5/01 1015

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Bismuth, Lead}; Mercury - 7470 - (CV)
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; Ammonia - 350.1; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) Semi-VOA -- 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D
(4) ICP Metals - 6010TR (Client List) {Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}
(5) ~~Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155; Gamma Spec -- Add-on {Radium-226, RADIUM-228}; ISOTOPIC THORIUM; Isotopic Thorium {Thorium-232}; Americium-241; Cesium-14; Neptunium-237, NICKEL-59; Strontium-89,90 -- Total Sr; Technetium-99; Total Uranium; Uranium-235; Isotopic Uranium~~

RT 6-28-01

Matrix *: S=Soil, SD=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquid, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-TW-1+2			DATA PACKAGE: #1409		
VALIDATOR: TCI		LAB: LLI		DATE: 2Dec01	
CASE:			SDG: #1409		

ANALYSES PERFORMED					
☐ 8010	☐ 8015	☐ 8020	☐ 8021	8140	8141
☐ 8150	☐ 8151	☐ WTPH-HCID	☐ WTPH-G	☐ WTPH-D	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX: B125Y4 B125X2 Soil
B125Y4RE B125X2RE

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . Yes (No) N/A

Comments: Samples were re-extracted outside
holding times — Jall RE

GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

3.1 INITIAL CALIBRATION

Was an initial calibration performed? . . . . . Yes No (N/A)

Are %RSD values for calibration or response factors acceptable? . . . . . Yes No (N/A)

Comments:_____

_____

_____

_____

_____

3.2 CONTINUING CALIBRATION

Was a continuing calibration check performed? . . . . . Yes No (N/A)

Are %D values for calibration or response factors acceptable? . Yes No (N/A)

Comments:_____

_____

_____

_____

_____

4. BLANKS

Were laboratory blanks analyzed? . . . . . (Yes) No N/A

Are laboratory blank results acceptable? . . . . . (Yes) No N/A

Were field/trip blanks analyzed? . . . . . Yes (No) N/A

Are field/trip blank results acceptable? . . . . . Yes No (N/A)

Comments:_____

_____

_____

_____

_____

5. ACCURACY

Were surrogates analyzed? . . . . . (Yes) No N/A

Are surrogate recoveries acceptable? . . . . . Yes (No) N/A

Were MS/MSD samples analyzed? . . . . . (Yes) No N/A

Are MS/MSD recoveries acceptable? . . . . . Yes (No) N/A

Were LCS samples analyzed? . . . . . Yes No (N/A)

Are LCS recoveries acceptable? . . . . . Yes No (N/A)

GENERAL GC DATA VALIDATION CHECKLIST

Comments: 0% surr S44 - ~~R~~ J
10% surr 5X2 - ~~R~~ J
MS 5X2 - 0 rec J
.44 - ok

6. PRECISION

Are MS/MSD sample RPD values acceptable? . . . . . Yes (No) N/A
Are field duplicate RPD values acceptable? . . . . . Yes No (N/A)
Are field split RPD values acceptable? . . . . . Yes No (N/A)
Comments: ~~X2 - J~~ X2 - already J'd

7. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No (N/A)
Is compound quantitation acceptable? . . . . . Yes No N/A
Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A
Are all results supported in the raw data? . . . . . Yes No (N/A)
Do results meet the CRQLs? . . . . . Yes (No) N/A
Comments: all undetects ~~are~~

Date: 10 December 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-TW-1&2 - Soil Sampling
Subject: Semivolatile - Data Package No. H1409-LLI (SDG No. H1409)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	Semivolatiles by 8270C
B125Y4	6/27/01	Soil	C	Semivolatiles by 8270C

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to a cooler temperature of 17°C upon arrival at the laboratory, all semivolatile results in sample B125Y4 were qualified as estimates and flagged "J".

All other holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control

limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike duplicate recovery of 37%, all 1,2,4-trichlorobenzene associated analytes (1,2,4-trichlorobenzene and hexachlorobenzene) in sample B125X2 were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the target required required quantitation limit (TRQL) are qualified as estimates and flagged "J". Sample results less than the TRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the TRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to RPDs outside QC limits, all semivolatile analytes in sample B125X2 were qualified as estimates and flagged "J".

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan TRQLs to ensure that laboratory detection levels meet the required criteria. All analytes met their TRQL.

- **Completeness**

Data package No. H1409-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a cooler temperature of 17°C upon arrival at the laboratory, all semivolatile results in sample B125Y4 were qualified as estimates and flagged "J". Due to RPDs outside QC limits, all semivolatile analytes in sample B125X2 were qualified as estimates and flagged "J". Due to a matrix spike duplicate recovery of 37%, all 1,2,4-trichlorobenzene associated analytes (1,2,4-trichlorobenzene and hexachlorobenzene) in sample B125X2 were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	B125Y4	Sample preservation
1,2,4-Trichlorobenzene Hexachlorobenzene	J	B125X2	MSD recovery
All	J	B125X2	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (MG/KG)

Project: BECHTEL-HANFORD															
Laboratory: Lionville Laboratory Inc.															
Case:	SDG: H1409														
Sample Number		B125X2		B125Y4											
Remarks															
Sample Date		6/27/01		6/27/01											
Extraction Date		7/6/01		7/6/01											
Analysis Date		7/12/01		7/12/01											
Semivolatile (8270C)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol		340	UJ	350	UJ										
bis(2-Chloroethyl)ether		340	UJ	350	UJ										
2-Chlorophenol		340	UJ	350	UJ										
1,3-Dichlorobenzene		340	UJ	350	UJ										
1,4-Dichlorobenzene		340	UJ	350	UJ										
1,2-Dichlorobenzene		340	UJ	350	UJ										
2-Methylphenol		340	UJ	350	UJ										
bis(2-Chloroisopropyl)ether		340	UJ	350	UJ										
4-Methylphenol		340	UJ	350	UJ										
N-Nitroso-di-n-propylamine		340	UJ	350	UJ										
Hexachloroethane		340	UJ	350	UJ										
Nitrobenzene		340	UJ	350	UJ										
Isophorone		340	UJ	350	UJ										
2-Nitrophenol		340	UJ	350	UJ										
2,4-Dimethylphenol		340	UJ	350	UJ										
bis(2-Chloroethoxy)methane		340	UJ	350	UJ										
2,4-Dichlorophenol		340	UJ	350	UJ										
1,2,4-Trichlorobenzene		340	UJ	350	UJ										
Naphthalene		340	UJ	350	UJ										
4-Chloroaniline		340	UJ	350	UJ										
Hexachlorobutadiene		340	UJ	350	UJ										
4-Chloro-3-methylphenol		340	UJ	350	UJ										
2-Methylnaphthalene		340	UJ	350	UJ										
Hexachlorocyclopentadiene		340	UJ	350	UJ										
2,4,6-Trichlorophenol		340	UJ	350	UJ										
2,4,5-Trichlorophenol		860	UJ	860	UJ										
2-Chloronaphthalene		340	UJ	350	UJ										
2-Nitroaniline		860	UJ	860	UJ										
Dimethylphthalate		340	UJ	350	UJ										
Acenaphthylene		340	UJ	350	UJ										
2,6-Dinitrotoluene		340	UJ	350	UJ										
3-Nitroaniline		860	UJ	860	UJ										
Acenaphthene		340	UJ	350	UJ										

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation of results. All other qualifiers shown were applied during validation.

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (MG/KG)

Project: BECHTEL-HANFORD															
Laboratory: Lionville Laboratory Inc.															
Case:	SDG: H1409														
Sample Number		B125X2		B125Y4											
Remarks															
Sample Date		6/27/01		6/27/01											
Extraction Date		7/6/01		7/6/01											
Analysis Date		7/12/01		7/12/01											
Semivolatile (8270C)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
2,4-Dinitrophenol		860	UJ	860	UJ										
4-Nitrophenol		860	UJ	860	UJ										
Dibenzofuran		340	UJ	350	UJ										
2,4-Dinitrotoluene		340	UJ	350	UJ										
Diethylphthalate		340	UJ	350	UJ										
4-Chlorophenyl-phenyl ether		340	UJ	350	UJ										
Fluorene		340	UJ	350	UJ										
4-Nitroaniline		860	UJ	860	UJ										
4,6-Dinitro-2-methylphenol		860	UJ	860	UJ										
N-Nitrosodiphenylamine		340	UJ	350	UJ										
4-Bromophenyl-phenyl ether		340	UJ	350	UJ										
Hexachlorobenzene		340	UJ	350	UJ										
Pentachlorophenol		860	UJ	860	UJ										
Phenanthrene		340	UJ	350	UJ										
Carbazole		340	UJ	350	UJ										
Di-n-butylphthalate		340	UJ	350	UJ										
Fluoranthene		340	UJ	350	UJ										
Pyrene		340	UJ	350	UJ										
Butylbenzylphthalate		340	UJ	350	UJ										
3,3'-Dichlorobenzidine		340	UJ	350	UJ										
Benzo(a)anthracene		340	UJ	350	UJ										
Chrysene		340	UJ	350	UJ										
bis(2-Ethylhexyl)phthalate		340	UJ	350	UJ										
Di-n-octylphthalate		340	UJ	350	UJ										
Benzo(b)fluoranthene		340	UJ	350	UJ										
Benzo(k)fluoranthene		340	UJ	350	UJ										
Benzo(a)pyrene		340	UJ	350	UJ										
Indeno(1,2,3-cd)pyrene		340	UJ	350	UJ										
Dibenz(a,h)anthracene		340	UJ	350	UJ										
Benzo(g,h,i)perylene		340	UJ	350	UJ										
Tributylphosphate	3300	340	UJ	350	UJ										

0000142

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List — Report Date: 07/27/01 14:53

RFW Batch Number: 0107L228 — Client: TMUHANFORD B01-058 H1409 — Work Order: 11343606001 — Page: 1a

	Cust ID:	B125Y4	B125Y4	B125Y4	SBLKBP	SBLKBP BS
Sample Information	RFW#:	001	001 MS	001 MSD	01LE0800-MB1	01LE0800-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	67 %	65 %	60 %	64 %	84 %
	2-Fluorobiphenyl	69 %	67 %	68 %	69 %	86 %
	p-Terphenyl-d14	105 %	80 %	92 %	93 %	113 %
	Phenol-d5	78 %	74 %	74 %	78 %	93 %
	2-Fluorophenol	73 %	66 %	67 %	70 %	85 %
	2,4,6-Tribromophenol	75 %	71 %	73 %	81 %	105 %
Phenol		350 U	69 %	71 %	330 U	87 %
bis(2-Chloroethyl)ether		350 U	350 U	350 U	330 U	330 U
2-Chlorophenol		350 U	64 %	67 %	330 U	83 %
1,3-Dichlorobenzene		350 U	350 U	350 U	330 U	330 U
1,4-Dichlorobenzene		350 U	51 %	57 %	330 U	72 %
1,2-Dichlorobenzene		350 U	350 U	350 U	330 U	330 U
2-Methylphenol		350 U	350 U	350 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)		350 U	350 U	350 U	330 U	330 U
4-Methylphenol		350 U	350 U	350 U	330 U	330 U
N-Nitroso-Di-n-propylamine		350 U	77 %	77 %	330 U	109 %
Hexachloroethane		350 U	350 U	350 U	330 U	330 U
Nitrobenzene		350 U	350 U	350 U	330 U	330 U
Isophorone		350 U	350 U	350 U	330 U	330 U
2-Nitrophenol		350 U	350 U	350 U	330 U	330 U
2,4-Dimethylphenol		350 U	350 U	350 U	330 U	330 U
bis(2-Chloroethoxy)methane		350 U	350 U	350 U	330 U	330 U
2,4-Dichlorophenol		350 U	350 U	350 U	330 U	330 U
1,2,4-Trichlorobenzene		350 U	58 %	62 %	330 U	80 %
Naphthalene		350 U	350 U	350 U	330 U	330 U
4-Chloroaniline		350 U	350 U	350 U	330 U	330 U
Hexachlorobutadiene		350 U	350 U	350 U	330 U	330 U
4-Chloro-3-methylphenol		350 U	70 %	71 %	330 U	96 %
2-Methylnaphthalene		350 U	350 U	350 U	330 U	330 U
Hexachlorocyclopentadiene		350 U	350 U	350 U	330 U	330 U
2,4,6-Trichlorophenol		350 U	350 U	350 U	330 U	330 U
2,4,5-Trichlorophenol		860 U	870 U	870 U	830 U	830 U

*= Outside of EPA CLP QC limits.

0000113

12/4/01

RFW Batch Number: 0107L228 Client: TNUHANFORD B01-058 H1409 Work Order: 11343606001 Page: 1b

	Cust ID:	B125Y4		B125Y4		B125Y4		SBLKBP		SBLKBP BS	
	RFW#:	001		001 MS		001 MSD		01LE0800-MB1		01LE0800-MB1	
2-Chloronaphthalene		350	U	350	U	350	U	330	U	330	U
2-Nitroaniline		860	U	870	U	870	U	830	U	830	U
Dimethylphthalate		350	U	350	U	350	U	330	U	330	U
Acenaphthylene		350	U	350	U	350	U	330	U	330	U
2,6-Dinitrotoluene		350	U	350	U	350	U	330	U	330	U
3-Nitroaniline		860	U	870	U	870	U	830	U	830	U
Acenaphthene		350	U	66	%	69	%	330	U	86	%
2,4-Dinitrophenol		860	U	870	U	870	U	830	U	830	U
4-Nitrophenol		860	U	52	%	53	%	830	U	72	%
Dibenzofuran		350	U	350	U	350	U	330	U	330	U
2,4-Dinitrotoluene		350	U	65	%	69	%	330	U	89	%
Diethylphthalate		350	U	350	U	350	U	330	U	330	U
4-Chlorophenyl-phenylether		350	U	350	U	350	U	330	U	330	U
Fluorene		350	U	350	U	350	U	330	U	330	U
4-Nitroaniline		860	U	870	U	870	U	830	U	830	U
4,6-Dinitro-2-methylphenol		860	U	870	U	870	U	830	U	830	U
N-Nitrosodiphenylamine (1)		350	U	350	U	350	U	330	U	330	U
4-Bromophenyl-phenylether		350	U	350	U	350	U	330	U	330	U
Hexachlorobenzene		350	U	350	U	350	U	330	U	330	U
Pentachlorophenol		860	U	73	%	76	%	830	U	100	%
Phenanthrene		350	U	350	U	350	U	330	U	330	U
Anthracene		350	U	350	U	350	U	330	U	330	U
Carbazole		350	U	350	U	350	U	330	U	330	U
Di-n-Butylphthalate		350	U	350	U	350	U	330	U	330	U
Fluoranthene		350	U	350	U	350	U	330	U	330	U
Pyrene		350	U	76	%	86	%	330	U	105	%
Butylbenzylphthalate		350	U	350	U	350	U	330	U	330	U
3,3'-Dichlorobenzidine		350	U	350	U	350	U	330	U	330	U
Benzo(a)anthracene		350	U	350	U	350	U	330	U	330	U
Chrysene		350	U	350	U	350	U	330	U	330	U
bis(2-Ethylhexyl)phthalate		350	U	350	U	93	J	330	U	330	U
Di-n-Octyl phthalate		350	U	350	U	350	U	330	U	330	U
Benzo(b)fluoranthene		350	U	350	U	350	U	330	U	330	U
Benzo(k)fluoranthene		350	U	350	U	350	U	330	U	330	U
Benzo(a)pyrene		350	U	350	U	350	U	330	U	330	U
Indeno(1,2,3-cd)pyrene		350	U	350	U	350	U	330	U	330	U
Dibenzo(a,h)anthracene		350	U	350	U	350	U	330	U	330	U
Benzo(g,h,i)perylene		350	U	350	U	350	U	330	U	330	U
Tributylphosphate		350	U	350	U	350	U	330	U	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

0000014

12/4/01

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List — Report Date: 07/27/01 14:58

RFW Batch Number: 0107L231 — Client: TNUHANFORD B01-058 H1409 — Work Order: 11343606001 — Page: 1a

	Cust ID:	B125X2	B125X2	B125X2	SBLKBP	SBLKBP BS
Sample Information	RFW#:	001	001 MS	001 MSD	01LE0800-MB1	01LE0800-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	63 %	64 %	38 %	64 %	84 %
	2-Fluorobiphenyl	69 %	66 %	39 %	69 %	86 %
	p-Terphenyl-d14	93 %	87 %	54 %	93 %	113 %
	Phenol-d5	77 %	72 %	43 %	78 %	93 %
	2-Fluorophenol	69 %	65 %	38 %	70 %	85 %
	2,4,6-Tribromophenol	88 %	74 %	44 %	81 %	105 %
Phenol		340 U	71 %	41 %	330 U	87 %
bis(2-Chloroethyl)ether		340 U	350 U	360 U	330 U	330 U
2-Chlorophenol		340 U	66 %	38 %	330 U	83 %
1,3-Dichlorobenzene		340 U	350 U	360 U	330 U	330 U
1,4-Dichlorobenzene		340 U	58 %	32 %	330 U	72 %
1,2-Dichlorobenzene		340 U	350 U	360 U	330 U	330 U
2-Methylphenol		340 U	350 U	360 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)		340 U	350 U	360 U	330 U	330 U
4-Methylphenol		340 U	350 U	360 U	330 U	330 U
N-Nitroso-Di-n-propylamine		340 U	86 %	49 %	330 U	109 %
Hexachloroethane		340 U	350 U	360 U	330 U	330 U
Nitrobenzene		340 U	350 U	360 U	330 U	330 U
Isophorone		340 U	350 U	360 U	330 U	330 U
2-Nitrophenol		340 U	350 U	360 U	330 U	330 U
2,4-Dimethylphenol		340 U	350 U	360 U	330 U	330 U
bis(2-Chloroethoxy)methane		340 U	350 U	360 U	330 U	330 U
2,4-Dichlorophenol		340 U	350 U	360 U	330 U	330 U
1,2,4-Trichlorobenzene		340 U	65 %	37 * %	330 U	80 %
Naphthalene		340 U	350 U	360 U	330 U	330 U
4-Chloroaniline		340 U	350 U	360 U	330 U	330 U
Hexachlorobutadiene		340 U	350 U	360 U	330 U	330 U
4-Chloro-3-methylphenol		340 U	73 %	43 %	330 U	96 %
2-Methylnaphthalene		340 U	350 U	360 U	330 U	330 U
Hexachlorocyclopentadiene		340 U	350 U	360 U	330 U	330 U
2,4,6-Trichlorophenol		340 U	350 U	360 U	330 U	330 U
2,4,5-Trichlorophenol		860 U	880 U	890 U	830 U	830 U

*= Outside of EPA CLP QC limits.

000015

12/4/01

	Cust ID:	B125X2	B125X2	B125X2	SBLKBP	SBLKBP BS
	RFW#:	001	001 MS	001 MSD	01LE0800-MB1	01LE0800-MB1
2-Chloronaphthalene		340 U	350 U	360 U	330 U	330 U
2-Nitroaniline		860 U	880 U	890 U	830 U	830 U
Dimethylphthalate		340 U	350 U	360 U	330 U	330 U
Acenaphthylene		340 U	350 U	360 U	330 U	330 U
2,6-Dinitrotoluene		340 U	350 U	360 U	330 U	330 U
3-Nitroaniline		860 U	880 U	890 U	830 U	830 U
Acenaphthene		340 U	63 %	39 %	330 U	86 %
2,4-Dinitrophenol		860 U	880 U	890 U	830 U	830 U
4-Nitrophenol		860 U	53 %	32 %	830 U	72 %
Dibenzofuran		340 U	350 U	360 U	330 U	330 U
2,4-Dinitrotoluene		340 U	62 %	35 %	330 U	89 %
Diethylphthalate		340 U	350 U	360 U	330 U	330 U
4-Chlorophenyl-phenylether		340 U	350 U	360 U	330 U	330 U
Fluorene		340 U	350 U	360 U	330 U	330 U
4-Nitroaniline		860 U	880 U	890 U	830 U	830 U
4,6-Dinitro-2-methylphenol		860 U	880 U	890 U	830 U	830 U
N-Nitrosodiphenylamine (1)		340 U	350 U	360 U	330 U	330 U
4-Bromophenyl-phenylether		340 U	350 U	360 U	330 U	330 U
Hexachlorobenzene		340 U	350 U	360 U	330 U	330 U
Pentachlorophenol		860 U	73 %	45 %	830 U	100 %
Phenanthrene		340 U	350 U	360 U	330 U	330 U
Anthracene		340 U	350 U	360 U	330 U	330 U
Carbazole		340 U	350 U	360 U	330 U	330 U
Di-n-Butylphthalate		340 U	350 U	360 U	330 U	330 U
Fluoranthene		340 U	350 U	360 U	330 U	330 U
Pyrene		340 U	80 %	48 %	330 U	105 %
Butylbenzylphthalate		340 U	350 U	360 U	330 U	330 U
3,3'-Dichlorobenzidine		340 U	350 U	360 U	330 U	330 U
Benzo(a)anthracene		340 U	350 U	360 U	330 U	330 U
Chrysene		340 U	350 U	360 U	330 U	330 U
bis(2-Ethylhexyl)phthalate		340 U	350 U	360 U	330 U	330 U
Di-n-Octyl phthalate		340 U	350 U	360 U	330 U	330 U
Benzo(b)fluoranthene		340 U	350 U	360 U	330 U	330 U
Benzo(k)fluoranthene		340 U	350 U	360 U	330 U	330 U
Benzo(a)pyrene		340 U	350 U	360 U	330 U	330 U
Indeno(1,2,3-cd)pyrene		340 U	350 U	360 U	330 U	330 U
Dibenzo(a,h)anthracene		340 U	350 U	360 U	330 U	330 U
Benzo(g,h,i)perylene		340 U	350 U	360 U	330 U	330 U
Tributylphosphate		340 U	350 U	360 U	330 U	330 U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

12/4/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Client: TNU-HANFORD B01-058
RFW #: 0107L228
SDG/SAF #: H1409/B01-058

W.O. #: 11343-606-001-9999-00
Date Received: 07-05-2001

SEMIVOLATILE

One (1) soil sample was collected on 06-27-2001.

The sample and its associated QC samples were extracted on 07-06-2001 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL and Tributylphosphate Semivolatile target compounds on 07-12,16-2001.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The sample was extracted and analyzed within required holding times.

3. A non-target compound was detected in the sample.

4. All surrogate recoveries were within EPA QC limits.

5. All matrix spike recoveries were within EPA QC limits.

6. All blank spike recoveries were within EPA QC limits.

7. Internal standard area and retention time criteria were met.

8. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

J. Michael Taylor
President
Lionville Laboratory Incorporated

8/6/01
Date

som\group\data\bna\tnu-hanford-0107-228.doc

208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

LVLI
LIONVILLE LABORATORY INC.

Client: TNU-HANFORD B01-058
LVL #: 0107L231
SDG/SAF #: H1409/B01-058

W.O. #: 11343-606-001-9999-00
Date Received: 07-05-2001

SEMIVOLATILE

One (1) soil sample was collected on 06-27-2001.

The sample and its associated QC samples were extracted on 07-06-2001 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL and Tributylphosphate Semivolatile target compounds on 07-16-2001.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The sample was extracted and analyzed within required holding times.

3. A non-target compound was detected in the sample.

4. All surrogate recoveries were within EPA QC limits.

5. One (1) of twenty-two (22) matrix spike recoveries was outside EPA QC limits. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

6. All blank spike recoveries were within EPA QC limits.

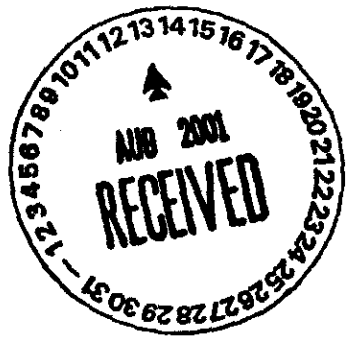
7. Internal standard area and retention time criteria were met.

8. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

by _____ 08-03-01
J. Michael Taylor — Date
President
Lionville Laboratory Incorporated

som\gorup\data\bns\tnu-hanford-0107-231.doc

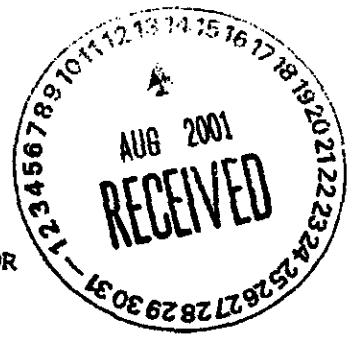
208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041



Lionville Laboratory, Inc.
BNA ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L228

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125Y4	001	S	01LE0800	06/27/01	07/06/01	07/12/01
B125Y4	001 MS	S	01LE0800	06/27/01	07/06/01	07/12/01
B125Y4	001 MSD	S	01LE0800	06/27/01	07/06/01	07/12/01
LAB QC:						
SBLKBP	MB1	S	01LE0800	N/A	07/06/01	07/16/01
SBLKBP	MB1 BS	S	01LE0800	N/A	07/06/01	07/16/01



Lionville Laboratory, Inc.
BNA ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L231

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2	001	S	01LE0800	06/27/01	07/06/01	07/16/01
B125X2	001 MS	S	01LE0800	06/27/01	07/06/01	07/16/01
B125X2	001 MSD	S	01LE0800	06/27/01	07/06/01	07/16/01
LAB QC:						
SBLKBP	MB1	S	01LE0800	N/A	07/06/01	07/16/01
SBLKBP	MB1 BS	S	01LE0800	N/A	07/06/01	07/16/01

Initiator: John W. Smith Batch: 0107L231 Parameter: 625 X
Date: 7/17/01 Samples: 001 T Matrix: Soil
Client: TWV Hanford 881-058 Method: SW846/MCAWW/CLP/ Prep Batch: 01LE0800
H1409

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other _____

b. General Discrepancy

__ Missing Sample/Extract* __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample* __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. Problem (Include all relevant specific results; attach data if necessary)

1,2,4-Trichlorobenzene fails low in -001 T. All other spikes and surrogates meet criteria.

2. Known or Probable Causes(s)

3. Discussion and Proposed Action Other Description: Report & Narrate

__ Re-log
__ Entire Batch
__ Following Samples: _____
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to _____
__ Place On/Take Off Hold (circle)

4. Project Manager Instructions...signature/date: [signature] 8/1/01

__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: QT 8/2/01 Other Explanation:

X Verified re-[log][leach][extract][digest][analysis] (circle)
X Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
__	X Initiator	__	__ Metals: Beegle
__	X Lab General Manager: M. Taylor	__	__ Inorganic: Perrone
1	X Project Mgr: Stone/Johnson/Haslett	__	__ GC/LC: Kiger
__	X Technical Mgr: Wesson/Daniels	2	__ MS: Rychlak/Laymon
__	X QA (file): Alberts	__	__ Log-in: Keppel
__	__ Data Management: Feldman	__	__ Admin: Soos
__	__ Sample Prep: Beegle/Kiger	__	__ Other: _____

L-WI-006/E-01/01

Lionville Laboratory Use Only: 0107L228

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

LVLI

Client: TRU- Hanford B01-058

Est. Final Proj. Sampling Date:

Project #: 11343-006-001-9999-00

Project Contact/Phone #:

Lionville Laboratory Project Manager: OS

QC: Spec Del: Std TAT: 30 day

Date Rec'd: 7-5-01 Date Due: 8-4-01

	A							B		C	D
Refrigerator #	4	→	→	→				4	4	4	4
#/Type Container – Liquid	1AG	→	→	→				1AG	→		
#/Type Container – Solid	↓							↓		1AG	1AG
Volume – Liquid											
Volume – Solid	500	→	→	→				500	→	1L	500
Preservatives	-	→	→	→				-	→	-	-
ANALYSES REQUESTED →	ORGANIC: VOA	BNA	Pest/PCB	Herb				INORG: Metal	CN		
Lionville Laboratory Use Only		0025X			ODRO			Met①	ICRL	Inorg①	Met②

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

A220000

Lab ID	Client ID/Description	MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA (0025X)	Pest/PCB	Herb	ODRO			Met①	ICRL	Inorg①	Met②
001	B12544	✓	✓	S	6/27/01	0430		✓			✓			✓	✓	✓	✓

Special Instructions: Saf B01-058

Met①=Cd, Cr, Cu, Ni, Ag, Bi, Pb, Hg,

Inorg①=ICCL, ICFL, ICNO2, ICNO3 ICPO4, ICSO4, INH3N, IN3N2, ICNTO, IOCT, IPH

Met②=Al, Bi, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Ag, Na, V, Zn

DATE/REVISIONS:
1. Ice melted waters to Tracks
2.
3.
4.
5.
6.

Lionville Laboratory Use Only

Samples were:
1) Shipped ✓ or Hand Delivered
Airbill # See Attached
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Samples Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

Tamper Resistant Seal was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 17° °C

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
[signature]	[signature]	7/5/01	1015				

COMPOSITE WASTE

ORIGINAL REWRITTEN

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES: 423579545524

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-058-14	Page 1 of 1

Collector: Thomas G./Watson D.	Company Contact: Todd, M.E.	Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: T-26/200 W		SAF No.: B01-058
Ice Chest No.: ERC99-065 / SML-442	Field Logbook No.: EL-1518	COA: B20TW1A44C	Method of Shipment: Fed EX
Shipped To: ~~TMA~~ RECRA	Offsite Property No.: A010428		Bill of Lading/Air Bill No.: 423579545524 / 5535

Price Code: 8N — Data Turnaround: 45 Days — Air Quality ☐

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive — COUNTS: BACKGROUND ON SPLIT SPOON < 0.5 mREM DOSE

Special Handling and/or Storage

Samples stored in Ref.# 1B at the 37 Shipping Facility on 6/27/01. Collector not available to relenquish samples on 7/2/01 for shipment

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1
Volume	500mL	1000mL	1000mL	500mL	500mL	1000mL

SAMPLE ANALYSIS

				See Item (1) in Special Instructions.	See Item (2) in Special Instructions.	VOA 8260A (TCL) DBW 6-27-01	See Item (3) in Special Instructions.	See Item (4) in Special Instructions.	See Item (5) in Special Instructions. DAJ 6-27-01				100023
Sample No.	Matrix *	Sample Date	Sample Time										
B125Y4	SOIL	06-27-01	0430	X	X		X	X				TCLP	B125Y5 B12631

CHAIN OF POSSESSION	Sign/Print Names			
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
DBWatson/TRWAC	6-27-01 0800	REF: 1B 3728	6-27-01 0800	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
Ref 1B 3728 7-2-01	0800	RThorp	7-2-01 0800	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
RThorp	7-2-01 0800	FEDEX		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
FedEx	7/5/01 10:15	KFleming	7/5/01 1015	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Bismuth, Lead}; Mercury - 7470 - (CV); Chromium Hex - 7196
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) Semi-VOA – 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D
(4) ICP Metals - 6010TR (Client List) {Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}
(5) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) {Gamma Spec - Add-on (Radium-226, Radium-228); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89/90 — Fuel Gr, Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium~~

6-23-01

Matrix *: S=Soil, SD=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DL=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

EHC-SS-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-058-2	Page 1 of 1

Collector	Company Contact / Telephone No.	Project Coordinator	Price Code / Data Turnaround
Thomas G./Watson D./Fahlgren, R.	Todd, M.E. (509) 372-9631	TRENT, SJ	8N / 45 Days
Project Designation	**Sampling Location**	**SAF No.**	**Air Quality** ☐
200-TW-1 & 2 - Soil Sampling	T-26/200 W	B01-058	
Ice Chest No. SM1 153 ET 6-30-01 268	**Field Logbook No.** EL-1518 / **COA** B20TW1A44C	**Method of Shipment** Government Vehicle/Fed EX	
Shipped To ET 6-28-01 Severn Trent Laboratories RCRA	**Offsite Property No.** RSR 104130	**Bill of Lading/Air Bill No.** N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive 55K dpm ACTIVITY ON BOTTLES <0.5 mrem dose

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None		
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
No. of Container(s)	1	1	1	DELETE	1	1	1	1		
Volume	120mL	60mL	250mL	500mL 6-28-01	250mL	120mL	250mL	250mL		
SAMPLE ANALYSIS	See Item (1) in Special Instructions.	Chromium Hex - 7196	See Item (2) in Special Instructions.	VOA - 8260A (TCL)	See Item (3) in Special Instructions.	See Item (4) in Special Instructions.	See Item (5) in Special Instructions.	Activity Scan		

Sample No.	Matrix *	Sample Date	Sample Time										
B125X2	SOIL	06-27-01	1115	X	X	X		X	X			TIE TO B2G89	0024

Samples stored in Ref.# IC at the 3728 Shipping Facility on 6/28/01. Collector not available to relinquish samples on 7/2/01 for shipment. ET 7-2-01

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R. Fahlgren	6-28-01 0800	Ref IC	6-28-01 0900
Ref IC 3728	7/2/01 0800	RThoren	7-2-01 0800
RThoren	7-2-01 0800	Ref IC	
Ref IC	7/5/01 1015	V. Skreen	7/5/01 1015
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP Metals - 6010A (Add-on) (Bismuth, Lead); Mercury - 7470 - (CV)
(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); Ammonia - 350.1; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) Semi-VOA – 8270A (Add-On) (Tributyl phosphate); TPH-Diesel Range - WTPH-D
(4) ICP Metals - 6010TR (Client List) (Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc)
(5) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Radium-226, Radium-228); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Hydrogen-3; Iodine-129; Strontium-89,90 – Total-Sr; Technetium-99; Total Uranium; Tritium - HP; Isotopic Uranium

RT 6-28-01

Matrix *
S=Soil
SD=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
O=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

RHLEF-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-TW-1+2			DATA PACKAGE: #1409		
VALIDATOR: TLI		LAB: LCI		DATE: 2Dec01	
CASE:			SDG: #1409		

ANALYSES PERFORMED

☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☐ SW-846 8260 (packed column)	☐ CLP Semivolatiles	☐ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX B125X2 B125Y4 Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No N/A

Is a case narrative present? . . . . . Yes No N/A

Comments:

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . Yes No N/A

Comments:

cooler temp 17° – Jdl Y4

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A
Are continuing calibrations acceptable? . . . . . Yes No N/A
Comments:

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A
Are laboratory blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments:

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . Yes No N/A
Are surrogate/System Monitoring Compound recoveries acceptable? Yes No N/A
Were MS/MSD samples analyzed? . . . . . Yes No N/A
Are MS/MSD results acceptable? . . . . . Yes No N/A
Comments: 124 trichlorobenzene 37% -X3

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . Yes (No) N/A

Are field duplicate RPD values acceptable? . . . . . Yes No (N/A)

Are field split RPD values acceptable? . . . . . Yes No (N/A)

Comments: all X2 out

7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No (N/A)

Are internal standard areas acceptable? . . . . . Yes No N/A

Are internal standard retention times acceptable? . . . . . Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No (N/A)

Is compound quantitation acceptable? . . . . . Yes No N/A

Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A

Are all results supported in the raw data? . . . . . Yes No (N/A)

Do results meet the CRQLs? . . . . . Yes No N/A

Has the laboratory properly identified and coded all TIC? . . . Yes No (N/A)

Comments: TBP — ok

Date: 10 December 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-TW-1&2 - Soil Sampling
Subject: Radiochemistry - Data Package No. H1409-ES (SDG No. H1409)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-ES prepared by Eberline Services (ES). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	See note 1
B125Y4	6/27/01	Soil	C	See note 1

1- Tritium; carbon-14; nickel-63; total strontium; americium-241; technetium-99; isotopic uranium, plutonium and thorium; neptunium-237; gamma spectroscopy; total uranium.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Data Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

  Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

  All holding times were acceptable.

- **Method Blanks**

  Laboratory Blanks

  Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

  All blank results were acceptable although the target required quantitation limits (TRQLs) were exceeded for 17 of the 29 analytes.

  Field Blank

  No field blanks were submitted for analysis.

- **Accuracy**

  Accuracy is evaluated from laboratory control sample (LCS) or samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30%, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

  Due to the lack of a matrix spike analysis, all carbon-14 and total uranium results were qualified as estimates and flagged "J".

  All other accuracy results were acceptable.

- ***Laboratory Duplicates***

  Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using

unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the TRQL and the RPD is less than 35%, no qualification is required. If either activity (concentration) is less than five times the TRQL, the RPD control limit is less than or equal to two times the TRQL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 45%, all plutonium-238 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 TRQLs to ensure that laboratory detection levels meet the required criteria. The following analytes were reported above their TRQL: Uranium-235(alpha), neptunium-237, radium-226, radium-228, europium-152, nickel-63, cobalt-60 and thorium-232(gea) in sample B125X2 and europium-154 in sample B125Y4. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TRQL.

- **Completeness**

Data package No. H1409-ES (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of a matrix spike analysis, all carbon-14 and total uranium results were qualified as estimates and flagged "J". Due to an RPD of 45%, all plutonium-238 results were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following analytes were reported above their TRQL: Uranium-235(alpha), neptunium-237, radium-226, radium-228, europium-152, nickel-63, cobalt-60 and thorium-232(gea) in sample B125X2 and europium-154 in sample B125Y4. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Carbon-14 Total uranium	J	All	No matrix spike
Plutonium-238	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G)

Project: BECHTEL-HANFORD																	
Laboratory: Eberline Services																	
Case	SDG: H1409																
Sample Number		B125X2		B125Y4													
Remarks																	
Sample Date		06/27/01		06/27/01													
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	400	0.466	U	0.028	U												
Carbon-14	50	-0.955	UJ	1.23	UJ												
Nickel-63	30	-1.80	U	0.487	U												
Total Strontium	1	49100		0.026	U												
Americium-241	1	227		-0.005	U												
Technetium-99	15	0.909	U	-0.007	U												
Thorium-228		4.09	U	0.447	U												
Thorium-230		0.582	U	0.284	U												
Thorium-232	1	1.74	U	0.365													
Total Uranium (ug/g)	1	61.1	J	1.72	J												
Uranium-233	1	18.1		0.355													
Uranium-235	1	1.22	U	0.061	U												
Uranium-238	1	21.1		0.659													
Neptunium-237	1	2.17	U	0.033	U												
Plutonium-238	1	35.2	J	0	UJ												
Plutonium-239/240	1	8320		0.086	U												
Potassium-40		17.0		4.98													
Cobalt 60	0.05	U	U	U	U												
Cesium 137	0.1	21200		0.540													
Radium-226	0.1	U	U	0.203													
Radium-228	0.2	U	U	0.246													
Europium 152	0.1	U	U	U	U												
Europium 154	0.1	61.9		U	U												
Europium 155	0.1	85.1		U	U												
Thorium-228(gas)		U	U	0.349													
Thorium-232(gas)		U	U	0.246													
Uranium-238(gas)		U	U	U	U												
Uranium-235(gas)		U	U	U	U												
Americium-241 (gas)		U	U	U	U												

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H1409

R107019-01 B125X2

DATA SHEET

SDG 7027 Client/Case no Hanford SDG H1409
Contact Melissa C. Mannion Contract No. 630

Lab sample id R107019-01 Client sample id B125X2
Dept sample id 7027-001 Location/Matrix T-26/200 W SOLID
Received 07/03/01 Collected/Weight 06/27/01 11:15 401.4 g
% solids 92.9 Custody/SAF No B01-058-2 B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.466	0.94	1.6	400	U	H
Carbon 14	14762-75-5	-0.955	2.7	4.6	50	U J	C
Nickel 63	13981-37-8	-1.80	31	52	30	U	NI_L
Total Strontium	SR-RAD	49100	230	11	1.0		SR
Americium 241	14596-10-2	227	19	4.1	1.0		AM
Technetium 99	14133-76-7	0.909	1.3	3.8	15	U	TC
Thorium 228	14274-82-9	4.09	4.7	6.5		U	TH
Thorium 230	14269-63-7	0.582	3.5	4.5	1.0	U	TH
Thorium 232	TH-232	1.74	2.3	4.5	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	61.1	7.1	0.12	0.10	J	U_T
Uranium 233	U-233/234	18.1	6.1	3.8	1.0		U
Uranium 235	15117-96-1	1.22	1.2	4.7	1.0	U	U
Uranium 238	U-238	21.1	6.2	3.8	1.0		U
Neptunium 237	13994-20-2	2.17	4.3	8.3	1.0	U	NP
Plutonium 238	13981-16-3	35.2	15	18	1.0	J	PU
Plutonium 239/240	PU-239/240	6320	540	7.8	1.0		PU
Potassium 40	13966-00-2	17.0	5.2	4.5			GAM
Cobalt 60	10198-40-0	U		0.85	0.050	U	GAM
Cesium 137	10045-97-3	21200	20	6.9	0.10		GAM
Radium 226	13982-63-3	U		9.1	0.10	U	GAM
Radium 228	15262-20-1	U		11	0.20	U	GAM
Europium 152	14683-23-9	U		20	0.10	U	GAM
Europium 154	15585-10-1	61.9	4.6	3.4	0.10		GAM
Europium 155	14391-16-3	85.1	8.0	12	0.10		GAM
Thorium 228	14274-82-9	U		8.2		U	GAM
Thorium 232	TH-232	U		11		U	GAM
Uranium 235	15117-96-1	U		19		U	GAM
Uranium 238	U-238	U		310		U	GAM

200-TW-1 & 2 - Soil Sampling

12/4/01

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 08/15/01

SDG	7027	Client/Case no	Hanford SDG H1409
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R107019-01	Client sample id	B125X2
Dept sample id	7027-001	Location/Matrix	T-26/200 W SOLID
Received	07/03/01	Collected/Weight	06/27/01 11:15 401.4 g
% solids	92.9	Custody/SAF No	B01-058-2 B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Americium 241	14596-10-2	U		300		U	GAM

200-TW-1 & 2 - Soil Sampling

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/15/01

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H1409

R107019-02 B125Y4

DATA SHEET

SDG 7027	Client/Case no Hanford	SDG H1409	
Contact Melissa C. Mannion	Contract No. 630		
Lab sample id R107019-02	Client sample id B125Y4		
Dept sample id 7027-002	Location/Matrix T-26/200 W	SOLID	
Received 07/03/01	Collected/Weight 06/27/01 04:30	1890 g	
% solids 90.2	Custody/SAF No B01-058-14	B01-058	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.028	0.055	0.092	400	U	H
Carbon 14	14762-75-5	1.23	2.6	4.2	50	U J	C
Nickel 63	13981-37-8	0.487	1.4	2.3	30	U	NI_L
Total Strontium	SR-RAD	0.026	0.16	0.33	1.0	U	SR
Americium 241	14596-10-2	-0.005	0.050	0.092	1.0	U	AM
Technetium 99	14133-76-7	-0.007	0.17	0.58	15	U	TC
Thorium 228	14274-82-9	0.447	0.33	0.50		U	TH
Thorium 230	14269-63-7	0.284	0.32	0.39	1.0	U	TH
Thorium 232	TH-232	0.365	0.24	0.31	1.0	J	TH
Total Uranium (ug/g)	7440-61-1	1.72	0.20	0.024	0.10		U_T
Uranium 233	U-233/234	0.355	0.20	0.19	1.0	J	U
Uranium 235	15117-96-1	0.061	0.062	0.23	1.0	U	U
Uranium 238	U-238	0.659	0.26	0.19	1.0	J	U
Neptunium 237	13994-20-2	0.033	0.067	0.10	1.0	U	NP
Plutonium 238	13981-16-3	0	0.057	0.22	1.0	U J	PU
Plutonium 239/240	PU-239/240	0.086	0.11	0.22	1.0	U	PU
Potassium 40	13966-00-2	4.98	2.6	0.43			GAM
Cobalt 60	10198-40-0	U		0.041	0.050	U	GAM
Cesium 137	10045-97-3	0.540	0.049	0.046	0.10		GAM
Radium 226	13982-63-3	0.203	0.11	0.080	0.10		GAM
Radium 228	15262-20-1	0.246	0.19	0.17	0.20		GAM
Europium 152	14683-23-9	U		0.097	0.10	U	GAM
Europium 154	15585-10-1	U		0.12	0.10	U	GAM
Europium 155	14391-16-3	U		0.075	0.10	U	GAM
Thorium 228	14274-82-9	0.349	0.073	0.046			GAM
Thorium 232	TH-232	0.246	0.19	0.17			GAM
Uranium 235	15117-96-1	U		0.13		U	GAM
Uranium 238	U-238	U		4.7		U	GAM

200-TW-1 & 2 - Soil Sampling

12/4/01

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 08/15/01

DATA SHEET, cont

SDG	7027	Client/Case no	Hanford SDG H1409
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R107019-02	Client sample id	B125Y4
Dept sample id	7027-002	Location/Matrix	T-26/200 W SOLID
Received	07/03/01	Collected/Weight	06/27/01 04:30 1890 g
% solids	90.2	Custody/SAF No	B01-058-14 B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Americium 241	14596-10-2	U		0.038		U	GAM

200-TW-1 & 2 - Soil Sampling

Rev 12/4/01

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 08/15/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1409 was composed of three solid (soil) samples designated under SAF No. B01-058 with a Project Designation of: 200-TW-1 & 2 – Soil Sampling.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

The matrix spike percent recovery (84%) was slightly below the 3σ limits (86 to 114%), but within the laboratory protocol limits (80 to120%). No other problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.5 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.6 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.7 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.8 Total Uranium Analyses

No problems were encountered during the course of the analyses.

2.9 Neptunium-237 Analyses

No problems were encountered during the course of the analyses.

2.10 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.11 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.12 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa C. Mannion
Melissa C. Mannion
Program Manager

8/16/01
Date

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B01-058-14

Collector: Thomas G./Watson D.	Company Contact: Todd, M.R. — Telephone No. (509) 372-9631	Project Coordinator: TRENT, SJ	Price Code 8N — Data Turnaround 45 Days
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: T-26/200 W H1409 (7027)	SAF No. B01-058	Air Quality ☐
Ice Chest No. ERC00-005/ERC99-023	Field Logbook No. EL-1518 — COA B20TW1A44C	Method of Shipment: Fed EX	
Shipped To: [illegible] RECRA	Offsite Property No. A010241	Bill of Lading/Air Bill No. 4235 7954 5502 / 5513	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive: COUNTS: BACKGROUND ON SPLIT SPOON < D. SHREER DOSE

Special Handling and/or Storage

000018

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	aG	aG	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1 (0)
Volume	500mL	1000mL	120mL	500mL	500mL	1000mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	VOA - 8260A (TCL)	See item (3) in Special Instructions.	See item (4) in Special Instructions.	See item (5) in Special Instructions.

Samples stored in Ref.# 1B at the 3[illegible] Shipping Facility on 6/27/01. Collector not available to relenquish samples on 7/2/01 for shipmen[t]

Sample No.	Matrix *	Sample Date	Sample Time							
B125Y4	SOIL	06-27-01	0430					X		TIE TO B12G7 / B12[illegible]

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
D. WATSON / [signature]	6-27-01 0820	REF 1B	06-27-01 0820
REF 1B [signature]	7-2-01 0800	R. Thorey	7-2-01 0800
R. Thorey	7-2-01 0800	FED EX	7-2-01
FED EXPRESS	7-3-01 2:??	8CH-2 E. [signature]	7-3-01 10A?

SPECIAL INSTRUCTIONS RT 6/29/01

~~(1) ICP Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP Metals - 6010A (Add-on) (Bismuth, Lead); Mercury - 7470 (CV); Chromium Hex - 7196~~
~~(2) IC Anions - 300.0 (Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate); Ammonia - 350.3; M2320G2 - 252.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045~~
~~(3) Semi-VOA - 8270A (Add-On) (Tributyl phosphate); TPH-Diesel Range - WTPH-D~~
~~(4) ICP Metals - 6010TR (Client List) (Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc)~~
(5) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Radium-226, Radium-228); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 - Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-058-2
Collector: Thomas G./Watson D./Fable R.	Company Contact: Todd, M.E. — Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: T-26/200 W — H1409 (7027)	SAF No.: B01-058	Air Quality ☐
Ice Chest No.: SM1-4616 (1 of 1)	Field Logbook No.: EL-1518 — COA: B20TW1A44C	Method of Shipment: Government Vehicle/Fed EX	
Shipped To: RT 6.28.01 Tma (EBERLINE)	Offsite Property No.: RSR 106556	Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive: 55k dpm activity on bottles <0.5 mrem dose

Special Handling and/or Storage

00J019

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None		
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
No. of Container(s)	1	1	1	1 DELETE 6.28.01 RT	1	1	1	1		
Volume	120mL	60mL	250mL	60mL	250mL	250mL	250mL	60mL		

SAMPLE ANALYSES

	See Item (1) in Special Instructions	Cs-137 - 7196	See Item (2) in Special Instructions	VOA - 8260A (TCL)	See Item (3) in Special Instructions	See Item (4) in Special Instructions	See Item (5) in Special Instructions	Activity Scan	
Sample No.	Matrix*	Sample Date	Sample Time						
B125X2	SOIL	06-27-01	1115				X	X	TIE TO B125X3

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 0800	Received By/Stored In	Date/Time 0800
R. Fable R. Fable 6-28-01		R. F I.C	6.28.01
Relinquished By/Removed From	Date/Time 0800	Received By/Stored In	Date/Time 0800
R. F L.C 3728 7.2.01		R. Thorel	7.2.01
Relinquished By/Removed From	Date/Time 0800	Received By/Stored In	Date/Time
R. Thorel	7.2.01	R. FED EX	7-2-01
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FED. Express	7-2-01 D.Div	SC-2 G. Pegram ENSR	D.Div 7-3-01
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

RT 6.28.01

(1) ICP-Metals - 6010A (TAL) (Cadmium, Chromium, Copper, Nickel, Silver); ICP-[illegible] (Add-on) (Bismuth, Lead); Mercury - 7470 - (CVAA).

(2) IC Anions - 9056 (Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); Ammonia - 350.1; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045

(3) Semi-VOA - 8270A (Add-On) (Tributyl phosphate); TPH Diesel Range - WTPH-D

(4) ICP-Metals - 6010TA (Other than TAL) (Aluminum, Barium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc)

(5) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Radium-226, Radium-228); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-89,90 – Total Sr; Technetium-99; Total Uranium; Tritium - H3; Isotopic Uranium

Samples stored in Ref.# 1C at the 3728 Shipping Facility on 6.28.01. Collector not available to relinquish samples on 7.2.01 for shipment. RT 7-2-01

Matrix*: Soil, Sediment, Sludge, Solid, Waste, Oil, Air, Liquid, Vegetation, Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-TW-1+2			DATA PACKAGE: H-1407		
VALIDATOR: TLI		LAB: ED		DATE: 2Dec01	
CASE:			SDG: H1407		

ANALYSES PERFORMED

☒ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	☒ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☒ Tritium C14	☒ Ni-63		

SAMPLES/MATRIX B125X2 B125Y4 Soil

1. Completeness . . . . . ☐ N/A

Technical verification forms present? . . . . . Yes No N/A

Comments: _____

2. Initial Calibration . . . . . ☐ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes No N/A

Initial calibration acceptable? . . . . . Yes No N/A

Standards NIST traceable? . . . . . Yes No N/A

Standards Expired? . . . . . Yes No N/A

Comments: _____

3. Continuing Calibration . . . . . ☒ N/A

Calibration checked within one week of sample analysis? . . .	Yes	No	N/A
Calibration check acceptable?	Yes	No	N/A
Calibration check standards NIST traceable?	Yes	No	N/A
Calibration check standards expired?	Yes	No	N/A

Comments:_____

4. Blanks . . . . . ☐ N/A

Method blank analyzed?	Yes	No	N/A
Method blank results acceptable?	Yes	No	N/A
Analytes detected in method blank?	Yes	No	N/A
Field blank(s) analyzed?	Yes	No	N/A
Field blank results acceptable?	Yes	No	N/A
Analytes detected in field blank(s)?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:_____

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed?	Yes	No	N/A
Spike recoveries acceptable?	Yes	No	N/A
Spike source traceable?	Yes	No	N/A
Spike source expired?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments: No chl MS - J all tot UR

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed?	(Yes)	No	N/A
LCS recoveries acceptable?	(Yes)	No	N/A
LCS traceable?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: _____

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added?	(Yes)	No	N/A
Chemical recovery acceptable?	(Yes)	No	N/A
Chemical carrier traceable?	Yes	No	(N/A)
Chemical carrier expired?	Yes	No	(N/A)
Transcription/Calculation errors?	Yes	No	(N/A)

Comments: _____

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed?	(Yes)	No	N/A
RPD Values Acceptable?	Yes	(No)	N/A
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: QU263 ~ 4576 Jall

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed?	Yes	(No)	N/A
Field duplicate RPD values acceptable?	Yes	No	(N/A)
Field split sample(s) analyzed?	Yes	(No)	N/A
Field split RPD values acceptable?	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	(No)	N/A
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments: _____

10. *Holding Times*

Are sample holding times acceptable?	(Yes)	No	N/A

Comments: _____

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses?	(Yes)	No	N/A
Results supported in raw data?	Yes	No	(N/A)
Results Acceptable?	(Yes)	No	N/A
Transcription/Calculation errors?	Yes	No	(N/A)
MDA's meet required detection limits?	Yes	(No)	N/A
Transcription/calculation errors?	Yes	No	(N/A)

Comments: ~~[redacted]~~ U235 (En) UP237 Ra 226/228 Fe152 X2
~~[redacted]~~ N1-63 ~~[redacted]~~ Th 232 Co60 ~~[redacted]~~

A-6

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H1409

R107019-04 Method Blank

METHOD BLANK

SDG 7027 Client/Case no Hanford SDG H1409
Contact Melissa C. Mannion Contract No. 630

Lab sample id R107019-04 Client sample id Method Blank
Dept sample id 7027-004 Material/Matrix SOLID
SAF No B01-058

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	1.50	3.3	5.5	400	U	H
Carbon 14	14762-75-5	-0.368	2.7	4.5	50	U	C
Nickel 63	13981-37-8	-0.882	30	51	30	U	NI_L
Total Strontium	SR-RAD	1.05	9.5	19	1.0	U	SR
Americium 241	14596-10-2	1.42	2.8	5.4	1.0	U	AM
Technetium 99	14133-76-7	-0.556	1.0	3.6	15	U	TC
Thorium 228	14274-82-9	-0.790	1.1	2.2		U	TH
Thorium 230	14269-63-7	-1.23	1.8	3.6	1.0	U	TH
Thorium 232	TH-232	0.175	0.53	0.67	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	0	0.005	0.012	0.10	U	U_T
Uranium 233	U-233/234	1.07	2.1	4.1	1.0	U	U
Uranium 235	15117-96-1	0	1.3	4.9	1.0	U	U
Uranium 238	U-238	0	1.1	4.1	1.0	U	U
Neptunium 237	13994-20-2	1.03	2.1	2.8	1.0	U	NP
Plutonium 238	13981-16-3	-0.612	2.4	5.9	1.0	U	PU
Plutonium 239/240	PU-239/240	1.84	2.5	4.7	1.0	U	PU
Potassium 40	13966-00-2	U		3.6		U	GAM
Cobalt 60	10198-40-0	U		0.31	0.050	U	GAM
Cesium 137	10045-97-3	U		0.32	0.10	U	GAM
Radium 226	13982-63-3	U		0.61	0.10	U	GAM
Radium 228	15262-20-1	U		1.2	0.20	U	GAM
Europium 152	14683-23-9	U		0.73	0.10	U	GAM
Europium 154	15585-10-1	U		0.86	0.10	U	GAM
Europium 155	14391-16-3	U		0.52	0.10	U	GAM
Thorium 228	14274-82-9	U		0.39		U	GAM
Thorium 232	TH-232	U		1.2		U	GAM
Uranium 235	15117-96-1	U		0.92		U	GAM
Uranium 238	U-238	U		37		U	GAM
Americium 241	14596-10-2	U		0.64		U	GAM

200-TW-1 & 2 - Soil Sampling

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 08/15/01

R107019-04 Method Blank

B L A N K , c o n t .

SDG	7027	Client/Case no	Hanford SDG H1409
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R107019-04	Client sample id	Method Blank
Dept sample id	7027-004	Material/Matrix	SOLID
		SAF No	B01-058

QC-BLANK 39162

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/15/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1409

R107019-03

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7027
Contact Melissa C. Mannion

Client/Case no Hanford SDG H1409
Case no No. 630

Lab sample id R107019-03
Dept sample id 7027-003

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No 801-058

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	485	11	5.4	400		H	479	19	101	83-117	80-120
Carbon 14	10200	100	13	50		C	11300	450	90	85-115	80-120
Nickel 63	5920	130	62	30		NI_L	5800	230	102	83-117	80-120
Total Strontium	1200	34	9.9	1.0		SR	1100	44	109	82-118	80-120
Americium 241	458	19	1.6	1.0		AM	478	19	96	89-111	80-120
Technetium 99	809	23	3.7	15		TC	787	31	103	83-117	80-120
Thorium 230	534	19	3.7	1.0		TH	510	20	105	89-111	80-120
Total Uranium (ug/g)	71.5	8.3	0.12	0.10		U_T	72.0	2.9	99	77-123	80-120
Uranium 233	468	44	21	1.0		U	464	19	101	83-117	80-120
Uranium 235	374	39	4.7	1.0		U	378	15	99	82-118	80-120
Uranium 238	520	47	20	1.0		U	505	20	103	83-117	80-120
Neptunium 237	483	51	3.1	1.0		NP	530	21	91	83-117	80-120
Plutonium 238	632	62	5.1	1.0		PU	620	25	102	82-118	80-120
Plutonium 239/240	690	66	5.1	1.0		PU	660	26	104	82-118	80-120
Cobalt 60	19.9	1.3	0.65	0.050		GAM	19.8	0.79	100	75-125	80-120
Cesium 137	20.9	1.1	0.85	0.10		GAM	20.5	0.82	102	75-125	80-120

200-TW-1 & 2 - Soil Sampling

QC-LCS 39161

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 08/15/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1409

R107019-05 B125X2

DUPLICATE

SDG 7027 Client/Case no Hanford SDG H1409

Contact Melissa C. Mannion Case no No. 630

DUPLICATE	ORIGINAL	
Lab sample id R107019-05	Lab sample id R107019-01	Client sample id B125X2
Dept sample id 7027-005	Dept sample id 7027-001	Location/Matrix T-26/200 W SOLID
	Received 07/03/01	Collected/Weight 06/27/01 11:15 401.4 g
% solids 92.9	% solids 92.9	Custody/SAF No B01-058-2 B01-058

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Tritium	0.250	0.93	1.6	400	U	H	0.466	0.94	1.6	U	-	
Carbon 14	0.257	2.6	4.3	50	U	C	-0.955	2.7	4.6	U	-	
Nickel 63	0.885	30	51	30	U	NI_L	-1.80	31	52	U	-	
Total Strontium	51000	230	9.7	1.0		SR	49100	230	11		4	21
Americium 241	204	33	7.6	1.0		AM	227	19	4.1		11	29
Technetium 99	2.08	1.1	3.2	15	U	TC	0.909	1.3	3.8	U	-	
Thorium 228	0.749	0.95	1.6		U	TH	4.09	4.7	6.5	U	-	
Thorium 230	-2.25	1.6	3.7	1.0	U	TH	0.582	3.5	4.5	U	-	
Thorium 232	0.749	0.55	0.65	1.0	J	TH	1.74	2.3	4.5	U	80	285
Total Uranium (ug/g)	61.5	7.1	0.12	0.10		U_T	61.1	7.1	0.12		1	31
Uranium 233	19.9	6.1	3.8	1.0		U	18.1	6.1	3.8		9	69
Uranium 235	1.80	2.4	4.6	1.0	U	U	1.22	1.2	4.7	U	-	
Uranium 238	24.4	7.1	3.8	1.0		U	21.1	6.2	3.8		15	63
Neptunium 237	1.88	1.9	2.8	1.0	U	NP	2.17	4.3	8.3	U	-	
Plutonium 238	22.3	13	19	1.0		PU	35.2	15	18		45	104
Plutonium 239/240	6380	680	20	1.0		PU	6320	540	7.8		1	23
Ruthenium 106	U		43		U	GAM	U				0	214
Antimony 125	U		25		U	GAM	U				0	214
Potassium 40	13.3	6.3	5.5			GAM	17.0	5.2	4.5		24	87
Cobalt 60	U		0.76	0.050	U	GAM	U		0.85	U	-	
Barium 133	U		8.2		U	GAM	U				0	215
Cesium 137	21100	20	6.8	0.10		GAM	21200	20	6.9		0	32
Radium 226	U		8.9	0.10	U	GAM	U		9.1	U	-	
Radium 228	U		9.8	0.20	U	GAM	U		11	U	-	
Europium 152	U		20	0.10	U	GAM	U		20	U	-	
Europium 154	57.3	4.6	3.7	0.10		GAM	61.9	4.6	3.4		8	36
Europium 155	81.8	7.8	11	0.10		GAM	85.1	8.0	12		4	38
Thorium 228	U		8.1		U	GAM	U		8.2	U	-	

200-TW-1 & 2 - Soil Sampling

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 08/15/01

DUPLICATE, cont.

SDG 7027		Client/Case no Hanford	SDG H1409
Contact Melissa C. Mannion		Case no No. 630	
DUPLICATE	ORIGINAL		
Lab sample id R107019-05	Lab sample id R107019-01	Client sample id B125X2	
Dept sample id 7027-005	Dept sample id 7027-001	Location/Matrix I-26/200 W	SOLID
	Received 07/03/01	Collected/Weight 06/27/01 11:15	401.4 g
% solids 92.9	% solids 92.9	Custody/SAF No B01-058-2	B01-058

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Thorium 232	U		9.8		U	GAM	U		11	U	-	
Uranium 235	U		18		U	GAM	U		19	U	-	
Uranium 238	U		300		U	GAM	U		310	U	-	
Americium 241	U		290		U	GAM	U		300	U	-	

200-TW-1 & 2 - Soil Sampling

QC-DUP#1 39163

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 08/15/01

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H1409

R107019-06 B125X2

MATRIX SPIKE

SDG 7027 Client/Case no Hanford SDG H1409

Contact Melissa C. Mannion Case no No. 630

MATRIX SPIKE		ORIGINAL			
Lab sample id	R107019-06	Lab sample id	R107019-01	Client sample id	B125X2
Dept sample id	7027-006	Dept sample id	7027-001	Location/Matrix	T-26/200 W SOLID
		Received	07/03/01	Collected/Weight	06/27/01 11:15 401.4 g
% solids	92.9	% solids	92.9	Custody/SAF No	B01-058-2 B01-058

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	720	7.3	1.6	400	X	H	857	34	0.466	0.94	84	86-114	60-140

200-TW-1 & 2 - Soil Sampling

QC-MS#1 39164

Lab id TNANC
Protocol Hanford
Version Ver 1.0
Form DVD-MS
Version 3.06
Report date 08/15/01

Date: 10 December 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200-TW-1&2 - Soil Sampling
Subject: Wet Chemistry - Data Package No. H1409-LLI (SDG No. H1409)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	C	See note 1
B125Y4	6/27/01	Soil	C	See note 1

1 - IC Anions - 300.0 (chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia - 350.3; cyanide - 9010B; total organic carbon (TOC) - 9060; pH - 9045C; nitrate/nitrite 353.2; chromium VI - 7196A.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 30 days for chromium VI; 28 days for ammonia, nitrate/nitrite and IC anions (chloride, sulphate, fluoride); 14 days for cyanide and total

organic carbon (TOC); 2 days for IC anions (nitrate, nitrite, phosphate); and immediate for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the samples being recieved at the laboratory without proper preservation (cooler temperature 17°C instead of 4°C), the TOC, ammonia, chromium VI and cyanide results in sample B125Y4 were qualified as estimates and flagged "J".

Holding times were met for all other parameters and samples.

- **Method Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the target required quantitation limit (TRQL) to be acceptable.

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125% (70-130% for TOC). Samples with a spike recovery of less than 30% and a sample value below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% (30-69% for TOC) and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% (130% and 70% for

TOC) and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 125% (130% for TOC) and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 0%, the chromium VI result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 73.4%, the nitrate/nitrite result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 73.3%, the phosphate result in sample B125Y4 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 74.8%, the chromium VI result in sample B125Y4 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 35%. If RPD values are out of specification and the sample concentration is greater than five times the target required quantitation limit (TRQL), all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the TRQL and the sample concentration is less than five times the TRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 35% for positive sample results greater than five times the TRQL or plus or minus the TRQL for positive sample results less than five times the TRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were within the required control limits.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

  Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 target required quantitation limits (TRQL) to ensure that laboratory detection levels meet the required criteria. Ammonia results in both samples were reported above the TRQL. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific TRQL.

- **Completeness**

Data package No. H1409-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the samples being recieved at the laboratory without proper preservation (cooler temperature 17°C instead of 4°C), the TOC, ammonia, chromium VI and cyanide results in sample B125Y4 were qualified as estimates and flagged "J". Due to a matrix spike recovery of 0%, the chromium VI result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 73.4%, the nitrate/nitrite result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 73.3%, the phosphate result in sample B125Y4 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 74.8%, the chromium VI result in sample B125Y4 was qualified as an estimate and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Ammonia results in both samples were reported above the TRQL. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, *200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan*, February 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WHC procedures are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
TOC Ammonia Chromium VI Cyanide	J	B125Y4	Sample preservation
Phosphate Chromium VI	J	B125Y4	Matrix spike recovery
Chromium VI Nitrate/nitrite	J	B125X2	Matrix spike recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

GENERAL CHEMISTRY ANALYSIS, SOIL MATRIX, (MG/KG) Page__1__of__1__

Project: BECHTEL-HANFORD																											
Laboratory: Lionville Laboratory Inc.																											
Case:	SDG: H1409																										
Sample Number		B125X2		B125Y4																							
Remarks																											
Sample Date		06/27/01		06/27/01																							
General Chemistry	TRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloride	2	3.6		2.6																							
Fluoride	5	188		9.5																							
Nitrite	2.5	1.34	U	1.32	U																						
Nitrate	2.5	12.1		33.4																							
Cyanide, total	0.5	0.43	U	0.41	UJ																						
Phosphate	5	13.1		2.5	J																						
Chromium VI	0.5	4.2	J	0.87	J																						
Sulfate	5	11.2		22.0																							
Nitrate/Nitrite		3.4	J	6.7																							
Ammonia, as N	0.5	5.3	U	5.3	UJ																						
Total Organic Carbon		132	U	188	J																						
pH		8.8		9.9																							

000011

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/27/01

CLIENT: TNUHANFORD B01-088 H1409 LVL LOT #: 0107L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B125X2	% Solids	93.4		%	0.01	1.0
		Chloride by IC	3.6		MG/KG	1.3	1.0
		Fluoride by IC	168		MG/KG	26.8	10.0
		Nitrite by IC	1.34	u	MG/KG	1.34	1.0
		Nitrate by IC	12.1		MG/KG	1.34	1.0
		Cyanide, Total	0.43	u	MG/KG	0.43	1.0
		Phosphate by IC	13.1		MG/KG	1.3	1.0
		Chromium VI	4.2	J	MG/KG	0.43	1.0
		Sulfate by IC	11.2		MG/KG	1.3	1.0
		Nitrate Nitrite	3.4	J	MG/KG	0.22	1.0
		Ammonia, as N	5.3	u	MG/KG	5.3	1.0
		Total Organic Carbon	132	u	MG/KG	132	1.0
		pH	8.8		SOIL PH	0.01	1.0

12/4/01

000012

Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/27/01

CLIENT: TNUHANFORD B01-058 N1409 LVL LOT #: 0107L228

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B12SY4	% Solids	94.4	%	0.01	1.0
		Chloride by IC	2.6	MG/KG	1.3	1.0
		Fluoride by IC	9.5	MG/KG	2.6	1.0
		Nitrite by IC	1.32 u	MG/KG	1.32	1.0
		Nitrate by IC	33.4	MG/KG	1.32	1.0
		Cyanide, Total	0.41 u J	MG/KG	0.41	1.0
		Phosphate by IC	2.5 J	MG/KG	1.3	1.0
		Chromium VI	0.87 J	MG/KG	0.42	1.0
		Sulfate by IC	22.0	MG/KG	1.3	1.0
		Nitrate Nitrite	6.7	MG/KG	0.21	1.0
		Ammonia, as N	5.3 u J	MG/KG	5.3	1.0
		Total Organic Carbon	188 J	MG/KG	129	1.0
		pH	9.9	SOIL PH	0.01	1.0

12/4/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LVLI
LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-058 H1409
LVL#: 0107L231

W.O.#: 11343-606-001-9999-00
Date Received: 07-05-01

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.

3. Sample holding times as required by the method and/or contract were met.

4. The cooler temperature was recorded on the chain of custody.

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Ammonia was within the 20% Relative Percent Difference (RPD) control limit.

7. The matrix spike (MS) recoveries were within the 75-125% control limits with the exception of Nitrate Nitrite that was below the control limits that may be attributed to sample inhomogeneity and Soluble Chromium VI MS recovery that was below the control limits that may be attributed to matrix interference to the potassium dichromate spiking solution.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit with the exception Nitrate, Sulfate and Total Organic Carbon (TOC) that may be attributed to sample inhomogeneity.

208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

9. Results for solid samples are reported on a dry weight basis and TOC samples are dried prior to analysis.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

07-30-01
Date

njp\407-228

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-058 H1409
LVL#: 0107L228

W.O.#: 11343-606-001-9999-00
Date Received: 07-05-01

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.

3. Sample holding times as required by the method and/or contract were met.

4. The cooler temperature was recorded on the chain of custody.

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Ammonia was within the 20% Relative Percent Difference (RPD) control limit.

7. The matrix spike recoveries were within the 75-125% control limits with the exception of Insoluble Chromium VI that was above the control limits and Soluble Chromium VI and Phosphate that were below the control limits; poor matrix spike recoveries may be attributed to sample inhomogeneity.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit with the exception Total Organic Carbon (TOC) that may be attributed to sample inhomogeneity.

9. Results for solid samples are reported on a dry weight basis and TOC samples are dried prior to analysis.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature..

Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

07-30-01
Date

njp\07-228

208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

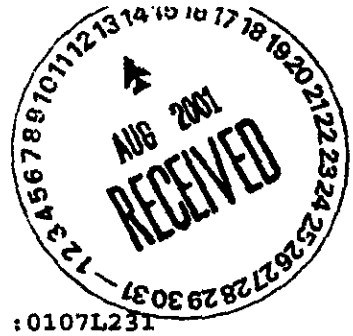
DATE RECEIVED: 07/05/01 LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL ORGANIC CARBON	001 MS	S	01LTZ019	06/27/01	07/18/01	07/20/01
PH	001	S	01LPH050	06/27/01	07/19/01	07/19/01
PH	001 REP	S	01LPH050	06/27/01	07/19/01	07/19/01

R QC:

CHLORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
CHLORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
TOTAL CYANIDE	LCS L	S	01LCA67	N/A	07/09/01	07/09/01
TOTAL CYANIDE	LCS L	S	01LCA67	N/A	07/09/01	07/09/01
TOTAL CYANIDE	MB1	S	01LCA67	N/A	07/09/01	07/09/01
PHOSPHATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
PHOSPHATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
CHROMIUM VI	MB1	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BS	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BSD	S	01LVIA61	N/A	07/20/01	07/20/01
SULFATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
SULFATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE NITRITE	MB1	S	01LN3F39	N/A	07/18/01	07/18/01
NITRATE NITRITE	MB1 BS	S	01LN3F39	N/A	07/18/01	07/18/01
AMMONIA	MB1	S	01LAM035	N/A	07/10/01	07/11/01
AMMONIA	MB1 BS	S	01LAM035	N/A	07/10/01	07/11/01
AMMONIA	MB1 BSD	S	01LAM035	N/A	07/10/01	07/11/01
TOTAL ORGANIC CARBON	MB1	S	01LTZ019	N/A	07/18/01	07/20/01
TOTAL ORGANIC CARBON	MB1 BS	S	01LTZ019	N/A	07/18/01	07/20/01

02



Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2						
% SOLIDS	001	S	01L%S083	06/27/01	07/06/01	07/07/01
% SOLIDS	001 REP	S	01L%S083	06/27/01	07/06/01	07/07/01
CHLORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
TOTAL CYANIDE	001	S	01LCA67	06/27/01	07/09/01	07/09/01
TOTAL CYANIDE	001 REP	S	01LCA67	06/27/01	07/09/01	07/09/01
TOTAL CYANIDE	001 MS	S	01LCA67	06/27/01	07/09/01	07/09/01
PHOSPHATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
CHROMIUM VI	001	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 REP	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MS	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MSD	S	01LVIA61	06/27/01	07/20/01	07/20/01
SULFATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE NITRITE	001	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 REP	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 MS	S	01LN3F39	06/27/01	07/18/01	07/18/01
AMMONIA	001	S	01LAM035	06/27/01	07/10/01	07/11/01
AMMONIA	001 REP	S	01LAM035	06/27/01	07/10/01	07/11/01
AMMONIA	001 MS	S	01LAM035	06/27/01	07/10/01	07/11/01
TOTAL ORGANIC CARBON	001	S	01LTZ019	06/27/01	07/18/01	07/20/01
TOTAL ORGANIC CARBON	001 REP	S	01LTZ019	06/27/01	07/18/01	07/20/01

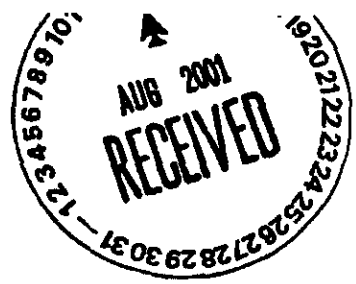
Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL ORGANIC CARBON	001 MS	S	01LTZ019	06/27/01	07/18/01	07/20/01
PH	001	S	01LPH050	06/27/01	07/19/01	07/19/01
PH	001 REP	S	01LPH050	06/27/01	07/19/01	07/19/01

QC:

CHLORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
CHLORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
TOTAL CYANIDE	LCS L	S	01LC068	N/A	07/11/01	07/11/01
TOTAL CYANIDE	LCS L	S	01LC068	N/A	07/11/01	07/11/01
TOTAL CYANIDE	MB1	S	01LC068	N/A	07/11/01	07/11/01
PHOSPHATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
PHOSPHATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
CHROMIUM VI	MB1	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BS	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BSD	S	01LVIA61	N/A	07/20/01	07/20/01
SULFATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
SULFATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE NITRITE	MB1	S	01LN3F39	N/A	07/18/01	07/18/01
NITRATE NITRITE	MB1 BS	S	01LN3F39	N/A	07/18/01	07/18/01
AMMONIA	MB1	S	01LAM036	N/A	07/18/01	07/19/01
AMMONIA	MB1 BS	S	01LAM036	N/A	07/18/01	07/19/01
AMMONIA	MB1 BSD	S	01LAM036	N/A	07/18/01	07/19/01
TOTAL ORGANIC CARBON	MB1	S	01LTZ019	N/A	07/18/01	07/20/01
TOTAL ORGANIC CARBON	MB1 BS	S	01LTZ019	N/A	07/18/01	07/20/01



Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125Y4						
% SOLIDS	001	S	01L%S083	06/27/01	07/06/01	07/07/01
% SOLIDS	001 REP	S	01L%S083	06/27/01	07/06/01	07/07/01
CHLORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
TOTAL CYANIDE	001	S	01LC068	06/27/01	07/11/01	07/11/01
TOTAL CYANIDE	001 REP	S	01LC068	06/27/01	07/11/01	07/11/01
TOTAL CYANIDE	001 MS	S	01LC068	06/27/01	07/11/01	07/11/01
PHOSPHATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
CHROMIUM VI	001	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 REP	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MS	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MSD	S	01LVIA61	06/27/01	07/20/01	07/20/01
SULFATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE NITRITE	001	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 REP	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 MS	S	01LN3F39	06/27/01	07/18/01	07/18/01
AMMONIA	001	S	01LAM036	06/27/01	07/18/01	07/19/01
AMMONIA	001 REP	S	01LAM036	06/27/01	07/18/01	07/19/01
AMMONIA	001 MS	S	01LAM036	06/27/01	07/18/01	07/19/01
TOTAL ORGANIC CARBON	001	S	01LTZ019	06/27/01	07/18/01	07/20/01
TOTAL ORGANIC CARBON	001 REP	S	01LTZ019	06/27/01	07/18/01	07/20/01

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-058-14	Page 1 of 1
Collector: Thomas G./Watson D.	Company Contact: Todd, M.E.	Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ	Price Code: 8N
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: T-26/200 W		SAF No.: B01-058	Air Quality ☐
Ice Chest No.: ERC99-065 / SML-442	Field Logbook No.: EL-1518	COA: B20TW1A44C	Method of Shipment: Fed EX	Data Turnaround: 45 Days
Shipped To: ~~Perma~~ RECRA	Offsite Property No.: A01 0428		Bill of Lading/Air Bill No.: 42357454-5524/5535	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive COUNTS: BKGROUND on SPLIT SPOON < D-SWEEN DOSE

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None
Type of Container	sG	sG	sG	sG	sG	sG
No. of Container(s)	1	1		1	1	1
Volume	500mL	1000mL	1 DELETE	500mL	500mL	1000mL

Samples stored in Ref.# 1B at the 3 Shipping Facility on 6/28/01. Collector not available to relenquisl samples on 7/2/01 for shipmer

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	See item (1) in Special Instructions.	See item (2) in Special Instructions.	VOA 8260A (TCL) DAW DELETE	See item (3) in Special Instructions.	See item (4) in Special Instructions.	See item (5) in Special Instructions. DAW DELETE				
B125Y4	SOIL	06-27-01	0430	X	X		X	X				TIETO	B125Y5 B126J

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
DOWSON/TRENT	6-27-01 0820	REF. 1B 3728	6-27-01 0820
Ref. 1B 3728 7.2.01	7.2.01 0800	R Thorey	7.2.01 0800
R Thorey 7.2.01	7.2.01 0800	FEDEX	
FEDEX	7/5/01 10:15	R Thorey	7/5/01 1015

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Bismuth, Lead}; Mercury - 7470 - (CV); Chromium Hex - 7196
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) Semi-VOA -- 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D
(4) ICP Metals - 6010TR (Client List) {Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}
~~(5) Gamma Spectroscopy (Gamma-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~ ~~Gamma Spec - Add-on (Radium-226, Radium-228) Isotopic Plutonium, Isotopic Uranium (Uranium-232), Americium-241, Carbon-14, Neptunium-237, Nickel-63, Strontium-89/90, Total Sr, Technetium-99, Total Uranium, Tritium, I-129, Isotopic Uranium~~

DT 6-23-01

Matrix *: S=Soil; SD=Sediment; SO=Solid; SL=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

220022

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-058-2	Page 1 of 1
Collector: Thomas G./Watson D./[illegible] A.	Company Contact: Todd, M.E. — Telephone No.: (509) 372-9631	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200-TW-1 & 2 - Soil Sampling	Sampling Location: T-26/200 W	SAF No.: B01-058	Air Quality ☐
Ice Chest No.: SM1 153 RT 6-30-01 268	Field Logbook No.: EL-1518 — COA: B20TW1A44C	Method of Shipment: Government Vehicle/Fed EX	
Shipped To: RT 6-28-01 RCRA — Severn Trent Incorporated	Offsite Property No.: RSR 104130	Bill of Lading/Air Bill No.: N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS

Radioactive 55k dpm ACTIVITY ON BOTTLES <0.5 mrem dose

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C	None	None	None		
Type of Container	aG	aG	aG	aG	aG	aG	aG	aG		
No. of Container(s)	1	1	1	DELETE 7/2/01	1	1	1	1		
Volume	120mL	60mL	250mL	60mL	250mL	120mL	250mL	250mL		

SAMPLE ANALYSIS

	See item (1) in Special Instructions.	Chromium Hex - 7196	See item (2) in Special Instructions.	VOA - 8260A (TCL)	See item (3) in Special Instructions.	See item (4) in Special Instructions.	See item (5) in Special Instructions.	Activity Scan		
Sample No.	Matrix *	Sample Date	Sample Time							
B125X2	SOIL	06-27-01	1115	X	X	X		X	X			TIE TO B9625

Samples stored in Ref.# IC at the 3728 Shipping Facility on 6/28/01. Collector not available to relinquish samples on 7/2/01 for shipment. RT 7-2-01

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R. Fable [illegible]	6-28-01 0800	R F I C	6-28-01 0800
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R F I C 3728	7/2/01 0800	RT Thoren	7-2-01 0800
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RT Thoren	7-2-01 0800	FEDEX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
FEDEX	7/5/01 1015	C. Hennessy	7/5/01 1015
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (TAL) {Cadmium, Chromium, Copper, Nickel, Silver}; ICP Metals - 6010A (Add-on) {Bismuth, Lead}; Mercury - 7470 - (CV)
(2) IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate}; Ammonia - 350.1; NO2/NO3 - 353.1; Total Cyanide - 9010; TOC - 9060; pH (Soil) - 9045
(3) Semi-VOA -- 8270A (Add-On) {Tributyl phosphate}; TPH-Diesel Range - WTPH-D
(4) ICP Metals - 6010TR (Client List) {Aluminum, Bismuth, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}
(5) ~~Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec. - Add-on (Radium-226, Radium-228); Isotopic Plutonium (Plutonium-232); Americium-241; Carbon-14; Neptunium-237; Nickel-63; Strontium-90,90 — Total-Sr, Technetium-99; Total Uranium; Tritium-3H; Isotopic Uranium~~

RT 6-28-01

Matrix *: S=Soil, SD=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WP=Wipe, L=Liquid, V=Vegetation, O=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-TW-1+2			DATA PACKAGE: #1409		
VALIDATOR: TLI		LAB: L-F		DATE: 2Dec01	
CASE:			SDG: #1409		

ANALYSES PERFORMED

☒ Anions/IC	☒ TOC	☐ TOX	☐ TPH-418.1	Oil and Grease	Alkalinity
☒ Ammonia	☐ BOD/COD	☐ Chloride	☒ Chromium-VI	☒ pH	☒ NO_3/NO_2
☐ Sulfate	☐ TDS	☐ TKN	☐ Phosphate	☒ cyanide	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX B125X2 B12544 Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments:

preservation - Cooler 17° 544

TOC, ammonia, hex chrome, cyanide - all J

A-23

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

Was initial calibration performed for all applicable analyses?	Yes	No	N/A
Are initial calibration results acceptable?	Yes	No	N/A
Was a calibration check performed for all applicable analyses?	Yes	No	N/A
Are calibration check results acceptable?	Yes	No	N/A

Comments: _____

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: _____

5. ACCURACY

Were spike samples analyzed at the required frequency?	Yes	No	N/A
Are spike recoveries acceptable?	Yes	No	N/A
Were LCS analyses performed at the required frequency?	Yes	No	N/A
Are LCS recoveries acceptable?	Yes	No	N/A

Comments: phosphate (73.3) + cr VI (74.8) - Jall 5/94
nitrate/nitrite (73.4) + COT (02) - Jall

6. PRECISION

Were laboratory duplicate samples analyzed at the required frequency?	Yes	No	N/A
Are laboratory duplicate sample RPD values acceptable?	Yes	No	N/A
Are field duplicate RPD values acceptable?	Yes	No	N/A
Are field split RPD values acceptable?	Yes	No	N/A

A-2007

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments:

7. ANALYTE QUANTITATION

Was analyte quantitation performed properly? . . . . . Yes No (N/A)

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A

Are results supported in the raw data? . . . . . Yes No (N/A)

Are results calculated properly? . . . . . Yes No (N/A)

Do results meet the CRDLs? . . . . . Yes (No) N/A

Comments: ammonia - both ones

Appendix 6

Additional Documentation Requested by Client

Lionville Lababoratory, Inc.

INORGANICS PRECISION REPORT 07/27/01

CLIENT: TNUHANFORD B01-088 H1409 LVL LOT #: 0107L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE RPD		DILUTION FACTOR(REP)
-001REP	B125X2	% Solids	93.4	94.4	1.1	1.0
		Chloride by IC	3.6	3.6	0.90	1.0
		Fluoride by IC	168	196	15.6	10.0
		Nitrite by IC	1.34u	1.34u	NC	1.0
		Nitrate by IC	12.1	15.6	25.2	1.0
		Cyanide, Total	0.43u	0.44u	NC	1.0
		Phosphate by IC	13.1	12.6	3.4	1.0
		Chromium VI	4.2	4.0	3.9	1.0
		Sulfate by IC	11.2	14.0	22.1	1.0
		Nitrate Nitrite	3.4	3.3	1.9	1.0
		Ammonia, as N	5.3 u	5.3 u	NC	1.0
		Total Organic Carbon	132 u	163	32.8	1.0
		pH	6.76	6.7	0.2	1.0

Lionville Lababoratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 07/27/01

LIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L231
ORK ORDER: 11343-606-001-9999-00

AMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
LANK10	01LAM038-MB1	Ammonia, as N	98.0	99.5	1.5

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Lionville Lababoratory, Inc.

INORGANICS ACCURACY REPORT 07/27/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B12SX2	Chloride by IC	52.4	3.6	53.6	93.1	2.0
		Fluoride by IC	731	168	536	105.2	10.0
		Nitrite by IC	47.1	1.34u	53.6	88.0	2.0
		Nitrate by IC	66.1	12.1	53.6	100.9	2.0
		Cyanide, Total	3.78	0.43u	3.92	96.6	1.0
		Phosphate by IC	61.1	13.1	53.6	89.6	2.0
		Soluble Chromium VI	2.1	4.2	4.3	0.0	1.0
		Insoluble Chromium VI	1610	4.2	1310	122.3	100
		Sulfate by IC	63.1	11.2	53.6	96.8	2.0
		Nitrate Nitrite	7.3	3.4	5.3	73.4	1.0
		Ammonia, as N	210	5.2 u	206	101.8	1.0
		Total Organic Carbon	2570	117	2670	92.1	1.0
BLANK10	01LICA45-MB1	Chloride by IC	23.5	1.2 u	25.0	93.9	1.0
		Fluoride by IC	54.6	2.5 u	50.0	109.2	1.0
		Nitrite by IC	23.6	1.25u	25.0	94.4	1.0
		Nitrate by IC	25.0	1.25u	25.0	100.1	1.0
		Phosphate by IC	25.4	1.2 u	25.0	101.8	1.0
		Sulfate by IC	23.1	1.2 u	25.0	92.4	1.0
BLANK10	01LVIA61-MB1	Soluble Chromium VI	3.6	0.40u	4.0	90.7	1.0
		Insoluble Chromium VI	1790	0.40u	1740	103.1	100
BLANK10	01LN3F39-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.0	1.0
BLANK10	01LAM025-MB1	Ammonia, as N	98.0	5.0 u	100	98.0	1.0
		Ammonia, as N MSD	99.5	5.0 u	100	99.5	1.0
BLANK10	01LTZ019-MB1	Total Organic Carbon	395	20.0 u	400	98.8	1.0

Lionville Lababoratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/27/01

CLIENT: TNUHANFORD B01-058 M1409 LVL LOT #: 0107L231

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	01LICA45-MB1	Chloride by IC	1.2	u	MG/KG	1.2	1.0
		Fluoride by IC	2.5	u	MG/KG	2.5	1.0
		Nitrite by IC	1.25	u	MG/KG	1.25	1.0
		Nitrate by IC	1.25	u	MG/KG	1.25	1.0
		Phosphate by IC	1.2	u	MG/KG	1.2	1.0
		Sulfate by IC	1.2	u	MG/KG	1.2	1.0
BLANK1	01LCA67-MB1	Cyanide, Total	0.50	u	MG/KG	0.50	1.0
BLANK10	01LVIA61-MB1	Chromium VI	0.40	u	MG/KG	0.40	1.0
BLANK10	01LN3F39-MB1	Nitrate Nitrite	0.20	u	MG/KG	0.20	1.0
ANK10	01LAM035-MB1	Ammonia, as N	5.0	u	MG/KG	5.0	1.0
BLANK10	01LTZ019-MB1	Total Organic Carbon	20.0	u	MG/KG	20.0	1.0

Lionville Lababoratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/27/01

CLIENT: TNUHANFORD BO1-058 H1409 LVL LOT #: 0107L228
WORK ORDER: 11342-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	01LICA45-MB1	Chloride by IC	1.2 u	MG/KG	1.2	1.0
		Fluoride by IC	2.5 u	MG/KG	2.5	1.0
		Nitrite by IC	1.25 u	MG/KG	1.25	1.0
		Nitrate by IC	1.25 u	MG/KG	1.25	1.0
		Phosphate by IC	1.2 u	MG/KG	1.2	1.0
		Sulfate by IC	1.2 u	MG/KG	1.2	1.0
BLANK1	01LC068-MB1	Cyanide, Total	0.50 u	MG/KG	0.50	1.0
BLANK10	01LVIA61-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0
BLANK10	01LN3F39-MB1	Nitrate Nitrite	0.20 u	MG/KG	0.20	1.0
:NK10	01LAM026-MB1	Ammonia, as N	5.0 u	MG/KG	5.0	1.0
BLANK10	01LTS019-MB1	Total Organic Carbon	20.0 u	MG/KG	20.0	1.0

Lionville Lababoratory, Inc.

INORGANICS ACCURACY REPORT 07/27/01

CLIENT: TWUHANFORD B01-088 H1409 LVL LOT #: 0107L228

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
-001	B125Y4	Chloride by IC	50.3	2.6	52.0	90.1	2.0
		Fluoride by IC	118	9.5	106	102.0	2.0
		Nitrite by IC	49.3	1.22u	53.0	93.0	2.0
		Nitrate by IC	83.0	33.4	53.0	93.7	2.0
		Cyanide, Total	4.55	0.41u	4.99	91.2	1.0
		Phosphate by IC	41.4	2.5	53.0	73.2	2.0
		Soluble Chromium VI	4.0	0.87	4.2	74.8	1.0
		Insoluble Chromium VI	1590	0.87	1230	129.0	100
		Sulfate by IC	69.4	22.0	53.0	89.6	2.0
		Nitrate Nitrite	11.3	6.7	5.3	87.8	2.0
		Ammonia, as N	210	5.3 u	210	100	1.0
		Total Organic Carbon	2650	188	2650	93.1	1.0
BLANK10	01LICA45-MB1	Chloride by IC	23.5	1.2 u	25.0	93.9	1.0
		Fluoride by IC	54.6	2.5 u	50.0	109.2	1.0
		Nitrite by IC	23.6	1.25u	25.0	94.4	1.0
		Nitrate by IC	25.0	1.25u	25.0	100.1	1.0
		Phosphate by IC	25.4	1.2 u	25.0	101.8	1.0
		Sulfate by IC	23.1	1.2 u	25.0	92.4	1.0
BLANK10	01LVIA61-MB1	Soluble Chromium VI	3.6	0.40u	4.0	90.7	1.0
		Insoluble Chromium VI	1790	0.40u	1740	103.1	100
BLANK10	01LN3P39-MB1	Nitrate Nitrite	5.2	0.20u	5.0	103.0	1.0
BLANK10	01LAM036-MB1	Ammonia, as N	96.0	5.0 u	100	96.0	1.0
		Ammonia, as N MSD	96.0	5.0 u	100	96.0	1.0
BLANK10	01LTE019-MB1	Total Organic Carbon	395	20.0 u	400	98.8	1.0

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Lionville Lababoratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 07/27/01

CLIENT: TNUHANFORD B01-058 H1409 LVL LOT #: 0107L228

WORK ORDER: 11243-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	01LAN036-MB1	Ammonia, as N	96.0	96.0	0.00

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Lionville Lababoratory, Inc.

INORGANICS PRECISION REPORT 07/27/01

CLIENT: TNUHANFORD BD1-088 H1409 LVL LOT #: 0107L228

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B12SY4	% Solids	94.4	95.6	1.3	1.0
		Chloride by IC	2.6	2.5	4.2	1.0
		Fluoride by IC	9.5	8.6	10.4	1.0
		Nitrite by IC	1.32u	1.32u	NC	1.0
		Nitrate by IC	33.4	31.6	5.6	1.0
		Cyanide, Total	0.41u	0.51u	NC	1.0
		Phosphate by IC	2.5	2.5	0.20	1.0
		Chromium VI	0.87	0.85	2.8	1.0
		Sulfate by IC	22.0	20.8	5.3	1.0
		Nitrate Nitrite	6.7	5.7	15.9	1.0
		Ammonia, as N	5.3 u	5.2 u	NC	1.0
		Total Organic Carbon	188	137	31.5	1.0
		pH	9.88	9.9	0.1	1.0

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